# INDEPENDENT ORBITER ASSESSMENT

ASSESSMENT
OF THE
REACTION CONTROL
SYSTEM
Vol. 5 of 5

**26 FEBRUARY 1988** 

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#### APPENDIX E DETAILED ANALYSIS

This appendix contains the IOA analysis worksheets supplementing previous results reported in STSEOS Working Paper 1.0-WP-VA86001-27, Analysis of the Reaction Control System, (19 January 1987). Prior results were obtained independently and documented before starting the FMEA/CIL assessment activity. Supplemental analysis was performed to address failure modes not previously considered by the IOA. Each sheet identifies the hardware item being analyzed, parent assembly and function performed. For each failure mode possible causes are identified, and hardware and functional criticality for each mission phase are determined as described in NSTS 22206, Instructions for Preparation of FMEA and CIL, 10 October 1986. Failure mode effects are described at the bottom of each sheet and worst case criticality is identified at the top.

## LEGEND FOR IOA ANALYSIS WORKSHEETS

## Hardware Criticalities:

- 1 = Loss of life or vehicle
- = Loss of mission or next failure of any redundant item (like or unlike) could cause loss of life/vehicle
- = All others 3

## Functional Criticalities:

- 1R = Redundant hardware items (like or unlike) all of which, if failed, could cause loss of life or vehicle.
- 2R = Redundant hardware items (like or unlike) all of which, if failed, could cause loss of mission.

### Redundancy Screen A:

- 1 = Is Checked Out PreFlight
- = Is Capable of Check Out PreFlight 3 = Not Capable of Check Out PreFlight
- NA = Not Applicable

# Redundancy Screens B and C: P = Passed Screen

- F = Failed Screen
- NA = Not Applicable

DATE: 9/15/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: FRCS FLIGHT: 1/1 10001 MDAC ID: ABORT: 1/1

PRESSURE RELIEF ASSEMBLY FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- PROP STOR & DIST SUBSYSTEM 3)
- PRESSURE RELIEF ASSEMBLY 4)

5)

ITEM:

6) 7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	1/1	RTLS:	1/1
LIFTOFF:	1/1	TAL:	1/1
ONORBIT:	1/1	AOA:	1/1
DEORBIT:	1/1	ATO:	1/1
LANDING/SAFING	: 1/1		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC284-0421

CAUSES: BELLOWS/HOUSING FAILURE, MATERIAL/MANUFACTURING DEFECT, HIGH PRESSURE

## EFFECTS/RATIONALE:

FIRST FAILURE IS POSSIBLE IS LOSS OF LIFE/VEHICLE DUE TO LOSS OF HELIUM PRESSURANT, INABILITY TO USE/DEPLETE PROP, AND POSSIBLE VENTING OF PROP OR PROP VAPORS INTO POD CREATING FIRE/EXPLOSION HAZARD. INABILITY TO DEPLETE PROP MAY RESULT IN VIOLATION OF ORBITER ENTRY MASS PROPERTY CONSTRAINTS, CAUSING LOSS OF LIFE/VEHICLE.

HIGHEST CRITICALITY HDW/FUNC 9/16/87

FLIGHT: 2/1R SUBSYSTEM: FRCS ABORT: 2/1R MDAC ID: 10002

HE ISOL VLV ITEM:

FAILURE MODE: RESTRICTED FLOW

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) HE PRESS SUBSYSTEM
- 4) HE ISOL VLV
- 5)
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/2R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	•		·

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ F ]

LOCATION:

PART NUMBER: 73P620001

CAUSES: CONTAMINATION

#### EFFECTS/RATIONALE:

WITH RESTRICTED FLOW IN ONE TANK ISOL VALVE, ONE FAILURE (RESTRICTED FLOW IN PARALLEL VALVE) AWAY FROM POSSIBLE LOSS OF LIFE/VEHICLE DURING ENTRY DUE TO INABILITY TO REPRESSURIZE PROP TANK, INABILITY TO USE/DEPLETE PROP, AND POSSIBLE VIOLATIONS OF ORBITER ENTRY MASS PROPERTY CONSTRAINTS.

DATE: 9/16/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: FRCS FLIGHT: 1/1 MDAC ID: 10003 ABORT: 1/1

ITEM:

HE ISOL VLV

FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) HE PRESS SUBSYSTEM
- 4) HE ISOL VLV
- 5)
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	2/2	TAL:	1/1
ONORBIT:	2/2	AOA:	1/1
DEORBIT:	1/1	ATO:	1/1
LANDING/SAFING	: 3/3		- <b>,</b> -

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: 73P620001

CAUSES: HOUSING FAILURE, MATERIAL/MANUFACTURING DEFECT, BELLOWS AND SEAL FAILURE, HIGH PRESSURE, WELD FAILURE

## EFFECTS/RATIONALE:

FIRST FAILURE IS POSSIBLE LOSS OF LIFE/VEHICLE DURING ENTRY DUE TO LOSS OF HELIUM PRESSURANT, INABILITY TO USE/DEPLETE PROP, AND POSSIBLE VIOLATIONS OF ORBITER ENTRY MASS PROPERTIES CONSTRAINTS.

DATE: 9/17/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 10004 ABORT: 3/1R

ITEM: HE PRESS REGULATOR ASSEMBLY

FAILURE MODE: INTERNAL LEAKAGE

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) HE PRESS SUBSYSTEM
- 4) HE PRESS REGULATOR ASSEMBLY
- 5)
- 6)
- 7)
- 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	: 3/R		

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: MC284-0418

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE, MATERIAL/MANUFACTURING DEFECT, SEAL FAILURE, PRESSURE SURGE

#### EFFECTS/RATIONALE:

FIRST FAILURE IS NO EFFECT. LOSS OF ALL REDUNDANCY RESULTS IN POSSIBLE LOSS OF LIFE/VEHICLE DUE TO EITHER OVERPRESSURIZATION AND RUPTURE OF PROP TANK, OR LOSS OF HELIUM THRU RELIEF VALVE, INABILITY TO USE/DEPLETE PROP, AND POSSIBLE VIOLATIONS OF ORBITER ENTRY MASS PROPERTY CONSTRAINTS.

DATE: 9/18/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: FRCS FLIGHT: 1/1

MDAC ID: 10005 ABORT: 1/1

ITEM: QUAD CHECK VALVE ASSEMBLY

FAILURE MODE: RESTRICTED FLOW

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) HE PRESS SUBSYSTEM
- 4) QUAD CHECK VALVE ASSEMBLY

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8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	2/1R	TAL:	1/1
ONORBIT:	2/2	AOA:	1/1
DEORBIT:	1/1	ATO:	1/1
LANDING/SAFING:	3/3		-, -

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC284-0481

CAUSES: CONTAMINATION, FILTER BLOCKAGE

#### EFFECTS/RATIONALE:

BLOCKAGE OF SINGLE INLET FILTER RESULTS IN POSSIBLE LOSS OF LIFE/VEHICLE DURING ENTRY. INABILITY TO REPRESS PROP TANK AND SUBSEQUENT INABILITY TO USE OR DEPLETE PROP MAY LEAD TO VIOLATIONS OF ORBITER ENTRY MASS PROPERTIES CONSTRAINTS.

DATE: 9/18/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: FRCS FLIGHT: 1/1 MDAC ID: 10006 ABORT: 1/1

ITEM:

QUAD CHECK VALVE ASSEMBLY

FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) HE PRESS SUBSYSTEM
- 4) QUAD CHECK VALVE ASSEMBLY

5)

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	1/1	RTLS:	1/1
LIFTOFF:	1/1	TAL:	1/1
ONORBIT:	1/1	AOA:	1/1
DEORBIT:	1/1	ATO:	1/1
LANDING/SAFING	: 1/1		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC284-0481

CAUSES: HOUSING FAILURE, MATERIAL/MANUFACTURING DEFECT, HIGH

PRESSURE

#### EFFECTS/RATIONALE:

FIRST FAILURE IS POSSIBLE LOSS OF LIFE/VEHICLE DURING ENTRY DUE TO LOSS OF HE PRESSURANT AND SUBSEQUENT INABILITY TO USE OR DEPLETE PROP RESULTING IN POSSIBLE VIOLATIONS OF ORBITER ENTRY MASS PROPERTIES CONSTRAINTS. MAY ALSO ALLOW LEAKAGE OF PROP OR PROP VAPORS LEADING TO FIRE/EXPLOSION HAZARD AND HAZARD TO GROUND CREW.

DATE: 9/21/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/1R MDAC ID: 10007 ABORT: 2/1R

ITEM: PRESSURE RELIEF ASSEMBLY

FAILURE MODE: VALVE FAILS OPEN, OR LEAKS INTERNALLY

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) PROP STOR & DIST SUBSYSTEM
- 4) PRESSURE RELIEF ASSEMBLY

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8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	2/1R	RTLS:	2/1R
LIFTOFF:	2/1R	TAL:	2/1R
ONORBIT:	2/1R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	2/1R		_,

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION:

PART NUMBER: MC284-0421

CAUSES: CONTAMINATION, VIBRATION, PIECE-PART STRUCTURAL FAILURE, MECHANICAL SHOCK, MATERIAL/MANUFACTURING DEFECT

#### EFFECTS/RATIONALE:

WITH FIRST FAILURE, ONE FAILURE (PREMATURE RUPTURE OR LEAK OF BURST DISK) AWAY FROM POSSIBLE LOSS OF LIFE/VEHICLE DUE TO LOSS OF HELIUM PRESSURANT, INABILITY TO MAINTAIN PROP TANK PRESSURE, AND INABILITY TO USE/DEPLETE PROP RESULTING IN POSSIBLE VIOLATONS OF ORBITER ENTRY MASS PROPERTIES CONSTRAINTS. FAILURES ALSO RESULT IN LEAKAGE OF PROP, FIRE/EXPLOSION HAZARD, AND HAZARD TO GROUND CREW.

DATE: 9/21/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 10008 ABORT: 3/1R

ITEM: PRESSURE RELIEF ASSEMBLY

FAILURE MODE: RESTRICTED FLOW

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) PROP STOR & DIST SUBSYSTEM
- 4) PRESSURE RELIEF ASSEMBLY
- 5)
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		

REDUNDANCY SCREENS: A [ 3 ] B [NA ] C [ P ]

LOCATION:

PART NUMBER: MC284-0421

CAUSES: CONTAMINATION, FILTER BLOCKAGE

#### EFFECTS/RATIONALE:

FIRST FAILURE IS NO EFFECT. LOSS OF ALL REDUNDANCY (REGS) IS POSSIBLE LOSS OF LIFE/VEHICLE DUE TO OVERPRESSURIZATION AND POSSIBLE RUPTURE OF PROP TANKS AND LINES RESULTING IN FIRE/EXPLOSION HAZARD, AND HAZARD TO GROUND CREW.

9/21/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 1/1 MDAC ID: 10009 ABORT: 1/1

ITEM: PRESSURE RELIEF ASSEMBLY

FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) PROP STOR & DIST SUBSYSTEM
- 4) PRESSURE RELIEF ASSEMBLY

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8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	1/1	RTLS:	1/1
LIFTOFF:	1/1	TAL:	1/1
ONORBIT:	1/1	AOA:	1/1
DEORBIT:	1/1	ATO:	1/1
LANDING/SAFING:	1/1		-, -

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC284-0421

CAUSES: HOUSING STRUCTURAL FAILURE, MATERIAL/MANUFACTURING

DEFECT, HIGH PRESSURE

#### EFFECTS/RATIONALE:

FIRST FAILURE IS POSSIBLE LOSS OF LIFE/VEHICLE. LOSS OF HELIUM PRESSURANT AND INABILITY TO MAINTAIN PROP TANK PRESSURE RESULTS IN INABILITY TO USE/DEPLETE PROP AND POSSIBLE VIOLATIONS OF ORBITER ENTRY MASS PROPERTIES CONSTRAINTS. FAILURE ALSO ALLOWS LEAKAGE OF PROP, CREATING FIRE/EXPLOSION HAZARD AND HAZARD TO GROUND CREW.

HIGHEST CRITICALITY HDW/FUNC 9/22/87 FLIGHT: 1/1 ABORT: 1/1 SUBSYSTEM: FRCS

MDAC ID: 10010

PROP TANK ISOL VLVS 1/2 & 3/4/5 ITEM: FAILURE MODE: RELIEF DEVICE FAILS TO RELIEVE

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) PROP STOR & DIST SUBSYSTEM
- 4) PROP TANK ISOL VLVS 1/2 & 3/4/5

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#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	1/1	RTLS:	3/3
LIFTOFF:	1/1	TAL:	3/3
ONORBIT:	1/1	AOA:	3/3
DEORBIT:	1/1	ATO:	1/1
LANDING/SAFING:	: 1/1		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC284-0430

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE, VIBRATION, MATERIAL/MANUFACTURING DEFECT

#### EFFECTS/RATIONALE:

FIRST FAILURE IS POSSIBLE LOSS OF LIFE/VEHICLE DUE TO POSSIBLE RUPTURE OF DOWNSTREAM LINES AND LOSS AND LEAKAGE OF PROP RESULTING IN FIRE/EXPLOSION HAZARD AND HAZARD TO GROUND CREW. VALVES OPEN DURING ABORTS.

DATE:

9/23/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS MDAC ID:

FLIGHT:

2/1R

10011

ABORT:

1/1

ITEM:

PROP TANK ISOL VLVS 1/2 & 3/4/5

FAILURE MODE: FAILS MID-TRAVEL

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) PROP STOR & DIST SUBSYSTEM
- PROP TANK ISOL VLVS 1/2 & 3/4/5 4)

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8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/11R	TAL:	1/1
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING	: 3/3		=, ==:

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: MC284-0430

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE.

MATERIAL/MANUFACTURING DEFECT

## EFFECTS/RATIONALE:

WORST CASE EFFECTS ARE THE SAME AS A FAILED CLOSED VALVE. WITH FIRST FAILURE, ONE FAILURE (FAIL MID-TRAVEL OF CLOSED OF PARALLEL VALVE) AWAY FROM POSSIBLE LOSS OF LIFE/VEHICLE DUE TO INABILITY TO USE OR DEPLETE FRCS PROP RESULTING IN POSSIBLE VIOLATIONS OR ORBITER ENTRY MASS PROPERTIES CONSTRAINTS. FIRST FAILURE DURING RTLS OR TAL IS POSSIBLE LOSS OF LIFE/VEHICLE DUE TO LOSS OF TWO FRCS YAW JETS AND POSSIBLE INABILITY TO COMPLETE FRCS DUMP.

DATE: 9/24/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: FRCS FLIGHT: 1/1 MDAC ID: 10012 ABORT: 1/1

ITEM: MANIFOLD 1-4 ISOLATION VALVES FAILURE MODE: RELIEF DEVICE FAILS TO RELIEVE

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1-4 ISOLATION VALVE

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7) 8)

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#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	1/1	RTLS:	3/3
LIFTOFF:	1/1	TAL:	3/3
ONORBIT:	1/1	AOA:	3/3
DEORBIT:	1/1	ATO:	1/1
LANDING/SAFING:	1/1		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC284-0430

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE, VIBRATION, MATERIAL/MANUFACTURING DEFECT

#### EFFECTS/RATIONALE:

FIRST FAILURE IS POSSIBLE LOSS OF LIFE/VEHICLE DUE TO POSSIBLE RUPTURE OF DOWNSTREAM LINES, AND LOSS/LEAKAGE OF PROP RESULTING IN FIRE/EXPLOSION HAZARD AND HAZARD TO GROUND CREW. VALVES OPEN DURING ABORTS.

DATE: 9/24/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/1R MDAC ID: 10013 ABORT: 1/1

ITEM: MANIFOLD 1-4 ISOLATION VALVES

FAILURE MODE: FAILS MID-TRAVEL

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1-4 ISOLATION VALVE

5)

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	3/3		-/

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: MC284-0430

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE, IMPROPER

INPUT, MATERIAL/MANUFACTURING DEFECT

### EFFECTS/RATIONALE:

WORST CASE EFFECTS ARE THE SAME AS THOSE FOR A FAILED CLOSED VALVE. WITH FIRST FAILURE, ONE FAILURE (FAILS MID-TRAVEL OR CLOSED OF ANOTHER MANIFOLD ISOL VALVE) AWAY FROM POSSIBLE LOSS OF LIFE/VEHICLE DUE TO INABILITY TO PERFORM FRCS DUMP POST DEORBIT BURN RESULTING IN POSSIBLE VIOLATIONS OF ORBITER ENTRY MASS PROPERTIES CONSTRAINTS. FIRST FAILURE DURING RTLS OR TAL IS POSSIBLE LOSS OF LIFE/VEHICLE DUE TO LOSS OF TWO YAW JETS AND POSSIBLE INABILITY TO COMPLETE FRCS DUMP.

HIGHEST CRITICALITY HDW/FUNC DATE: 9/24/87 FLIGHT: 1/1 ABORT: 1/1 SUBSYSTEM: FRCS MDAC ID: 10014

MANIFOLD 5 ISOLATION VALVE ITEM: FAILURE MODE: RELIEF DEVICE FAILS TO RELIEVE

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5 ISOLATION VALVE

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8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	1/1	RTLS:	1/1
LIFTOFF:	1/1	TAL:	1/1
ONORBIT:	1/1	AOA:	1/1
DEORBIT:	1/1	ATO:	1/1
LANDING/SAFING:	: 1/1		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC284-0420

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE, VIBRATION,

MATERIAL/MANUFACTURING DEFECT

EFFECTS/RATIONALE:

FIRST FAILURE IS POSSIBLE LOSS OF LIFE/VEHICLE DUE TO POSSIBLE RUPTURE OF DOWNSTREAM LINES, AND LOSS/LEAKAGE OF PROP RESULTING IN FIRE/EXPLOSION HAZARD AND HAZARD TO GROUND CREW.

DATE: 9/28/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 10015 ABORT: 3/2R

ITEM: THRUSTER BIPROP SOLENOID VALVE, PRIMARY, +Z AXIS

FAILURE MODE: FAILS CLOSED, FAILS OFF

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) THRUSTER SUBSYSTEM
- 4) THRUSTER BIPROP SOLENOID VALVE, PRIMARY, +Z AXIS

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8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ 3 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: MC467-0028

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE, LOSS OF INPUT, FROZEN PROPELLANT, MATERIAL/MANUFACTURING DEFECT

#### EFFECTS/RATIONALE:

FIRST FAILURE IS NO EFFECT. LOSS OF ALL REDUNDANCY (ALL FRCS +Z JETS) IS POSSIBLE LOSS OF MISSION. +Z JETS NOT CRITICAL FOR ET SEP, FRCS DUMPING, OR ENTRY CONTROL.

DATE: 9/28/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: FRCS FLIGHT: 1/1 MDAC ID: 10016 ABORT: 1/1

ITEM: THRUSTER BIPROP SOLENOID VLV, PRIMARY, ALL AXES

FAILURE MODE: FAILS ON, PREMATURE OPERATION

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) THRUSTER SUBSYSTEM
- 4) THRUSTER BIPROP SOLENOID VLV, PRIMARY, ALL AXES

5) 6) 7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	1/1	RTLS:	1/1
LIFTOFF:	1/1	TAL:	1/1
ONORBIT:	1/1	AOA:	1/1
DEORBIT:	1/1	ATO:	1/1
LANDING/SAFING	: 1/1		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC467-0028

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE,

PREMATURE/CONTINUOUS/IMPROPER INPUT

EFFECTS/RATIONALE:

FIRST FAILURE DURING FLIGHT COULD RESULT IN CONTACT WITH PAYLOAD DURING RENDEZVOUS, CAUSING LOSS OF VEHICLE OR EVA CREW. FIRST FAILURE DURING GROUND PHASES COULD RESULT IN LOSS OF GROUND CREW DUE TO EXPOSURE TO PROP VAPORS AND EXHAUST PLUME.

DATE: 9/29/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: FRCS FLIGHT: 1/1

MDAC ID: 10017 1/1 ABORT:

ITEM: THRUSTER BIPROP SOLENOID VALVE, VERNIER, ALL AXES

FAILURE MODE: FAILS ON, PREMATURE OPERATION

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) THRUSTER SUBSYSTEM
- 4) THRUSTER BIPROP SOLENOID VALVE, VERNIER, ALL AXES

5) 6)

7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	1/1	RTLS:	1/1
LIFTOFF:	1/1	TAL:	1/1
ONORBIT:	1/1	AOA:	1/1
DEORBIT:	1/1	ATO:	1/1
LANDING/SAFING:	1/1		-, -

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC467-0029

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE,

PREMATURE/CONTINUOUS/IMPROPER INPUT

#### EFFECTS/RATIONALE:

FIRST FAILURE DURING FLIGHT COULD RESULT IN CONTACT WITH PAYLOAD DURING RENDEZVOUS, CAUSING LOSS OF VEHICLE OR EVA CREW. FIRST FAILURE DURING GROUND PHASES COULD RESULT IN LOSS OF GROUND CREW DUE TO EXPOSURE TO PROP VAPORS AND EXHAUST PLUME.

HIGHEST CRITICALITY HDW/FUNC 9/29/87 DATE: FLIGHT: 1/1 SUBSYSTEM: FRCS ABORT: 1/1 MDAC ID: 10018 THRUSTER INJECTOR HEAD ASSEMBLY, PRIMARY

ITEM:

FAILURE MODE: RESTRICTED FLOW

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) THRUSTER SUBSYSTEM
- 4) THRUSTER INJECTOR HEAD ASSEMBLY, PRIMARY

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6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	1/1	TAL:	1/1
ONORBIT:	1/1	AOA:	1/1
DEORBIT:	1/1	ATO:	1/1
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC467-0028

CAUSES: CONTAMINATION, PROP FREEZING

#### EFFECTS/RATIONALE:

FIRST FAILURE COULD RESULT IN LOSS OF LIFE/VEHICLE. IMPROPER MISTURE RATIO OR INADEQUATE COOLING COULD RESULT IN COMBUSTION CHAMBER OR NOZZLE EXTENSION BURN-THROUGH.

DATE: 9/29/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: FRCS FLIGHT: 1/1 MDAC ID: 10019 ABORT: 1/1

ITEM: THRUSTER INJECTOR HEAD ASSEMBLY, PRIMARY

FAILURE MODE: STRUCTURAL FAILURE, BURN-THROUGH

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) THRUSTER SUBSYSTEM
- 4) THRUSTER INJECTOR HEAD ASSEMBLY, PRIMARY

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8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	1/1	RTLS:	1/1
LIFTOFF:	1/1	TAL:	1/1
ONORBIT:	1/1	AOA:	1/1
DEORBIT:	1/1	ATO:	1/1
LANDING/SAFING	: 1/1		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC467-0028

CAUSES: PIECE-PART STRUCTURAL FAILURE, MATERIAL/MANUFACTURING DEFECT, COMBUSTION ANOMALIES, CONTAMINATION

#### EFFECTS/RATIONALE:

FIRST FAILURE IS POSSIBLE LOSS OF LIFE/VEHICLE. MIXING OF MMH AND N204 IN INJECTOR, OR BURN-THROUGH OF INJECTOR RESULTS IN POSSIBLE FIRE/EXPLOSION AND DAMAGE TO VEHICLE.

DATE: 10/02/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 2/1R MDAC ID: 10020 ABORT: 2/1R

ITEM: HE ISOL VLV FAILURE MODE: RESTRICTED FLOW

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) HE PRESS SUBSYSTEM
- 4) HE ISOL VLV
- 5)
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

	O1/2 * 2 O1/	<u></u>	
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/2R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ F ]

LOCATION:

PART NUMBER: MC284-0419

CAUSES: CONTAMINATION

#### EFFECTS/RATIONALE:

WITH RESTRICTED FLOW IN ONE ISOL VLV, ONE FAILURE (RESTRICTED FLOW OR FAILED CLOSED PARALLEL VLV) AWAY FROM POSSIBLE LOSS OF LIFE/VEHICLE DURING ENTRY DUE TO INABILITY TO REPRESS PROP TANK, INABILITY TO USE OR DEPLETE PROP, AND POSSIBLE VIOLATIONS OF ORBITER ENTRY MASS PROPERTIES CONSTRAINTS AND PROP TANK LANDING WEIGHT CONSTRAINTS.

DATE: 10/02/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 1/1
MDAC ID: 10021 ABORT: 1/1

ITEM: HE ISOL VLV

FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) HE PRESS SUBSYSTEM
- 4) HE ISOL VLV
- 5)
- 6)
- 7) 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	2/2	TAL:	1/1
ONORBIT:	2/2	AOA:	1/1
DEORBIT:	1/1	ATO:	1/1
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC284-0419

CAUSES: HOUSING FAILURE, MATERIAL/MANUFACTURING DEFECT, BELLOWS AND SEALS FAILURES, HIGH PRESSURE, WELD FAILURE

## EFFECTS/RATIONALE:

FIRST FAILURE IS POSSIBLE LOSS OF LIFE/VEHICLE DURING ENTRY DUE TO LOSS OF HELIUM PRESSURANT, INABILITY TO USE OR DEPLETE PROP, AND POSSIBLE VIOLATIONS OF ORBITER ENTRY MASS PROPERTIES CONSTRAINTS AND PROP TANK LANDING WEIGHT CONSTRAINTS.

DATE: 10/05/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 10022 ABORT: 3/1R

ITEM: HE PRESS REGULATOR ASSEMBLY

FAILURE MODE: INTERNAL LEAKAGE

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) HE PRESS SUBSYSTEM
- 4) HE PRESS REGULATOR ASSEMBLY

5)

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	*		

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: MC284-0418

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE, MATERIAL/MANUFACTURING DEFECT, SEAL FAILURE, PRESSURE SURGE

### EFFECTS/RATIONALE:

FIRST FAILURE IS NO EFFECT. LOSS OF ALL REDUNDANCY RESULTS IN POSSIBLE LOSS OF LIFE/VEHICLE DUE TO EITHER OVERPRESSURIZATION AND RUPTURE OF PROP TANK, OR LOSS OF HELIUM THRU RELIEF VALVE, INABILITY TO USE OR DEPLETE PROP, AND POSSIBLE VIOLATIONS OF ORBITER ENTRY MASS PROPERTIES CONSTRAINTS AND/OR PROP TANK LANDING WEIGHT CONSTRAINTS.

DATE: 10/05/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 1/1 MDAC ID: 10023 ABORT: 1/1

ITEM: QUAD CHECK VALVE ASSEMBLY

FAILURE MODE: RESTRICTED FLOW

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) HE PRESS SUBSYSTEM
- 4) QUAD CHECK VALVE ASSEMBLY

5)

6)

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8) 9)

#### CRITICALITIES

NC ABORT	HDW/FUNC
RTLS:	1/1
TAL:	1/1
AOA:	1/1
ATO:	1/1
	- <b>/ -</b>
	RTLS: TAL: AOA:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC284-0481

CAUSES: CONTAMINATION, FILTER BLOCKAGE

#### EFFECTS/RATIONALE:

BLOCKAGE OF SINGLE INLET FILTER RESULTS IN POSSIBLE LOSS OF LIFE/VEHICLE DURING ENTRY. INABILITY TO REPRESS PROP TANK AND SUBSEQUENT INABILITY TO USE OR DEPLETE PROP MAY RESULT IN VIOLATIONS OF ORBITER ENTRY MASS PROPERTIES CONSTRAINTS OR PROP TANK LANDING WEIGHT CONSTRAINTS.

DATE: 10/05/87 HIGHEST CRITICALITY HDW/FUNC FLIGHT: 1/1

SUBSYSTEM: ARCS FLIGHT: 1/1
MDAC ID: 10024 ABORT: 1/1

ITEM: QUAD CHECK VALVE ASSEMBLY

FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) HE PRESS SUBSYSTEM
- 4) QUAD CHECK VALVE ASSEMBLY

5)

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	1/1	RTLS:	1/1
LIFTOFF:	1/1	TAL:	1/1
ONORBIT:	1/1	AOA:	1/1
DEORBIT:	1/1	ATO:	1/1
LANDING/SAFING:	1/1		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC284-0481

CAUSES: HOUSING FAILURE, MATERIAL/MANUFACTURING DEFECT, HIGH

**PRESSURE** 

EFFECTS/RATIONALE:

FIRST FAILURE OF POSSIBLE LOSS OF LIFE/VEHICLE. LOSS OF HE PRESSURANT, INABILITY TO MAINTAIN PROP TANK PRESSURE, AND SUBSEQUENT INABILITY TO USE OR DEPLETE PROP RESULTS IN POSSIBLE VIOLATIONS OF ORBITER ENTRY MASS PROPERTIES CONSTRAINTS AND PROP TANK LANDING WEIGHT OCNSTRAINTS. FIRST FAILURE MAY ALSO ALLOW LEAKAGE OF PROP OR PROP VAPORS LEADING TO FIRE/EXPLOSION HAZARD AND HAZARD TO GROUND CREW.

DATE: 10/06/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 2/1R MDAC ID: 10025 ABORT: 2/1R

ITEM: PRESSURE RELIEF ASSEMBLY

FAILURE MODE: VALVE FAILS OPEN, OR LEAKS INTERNALLY

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) PROP STOR & DIST SUBSYSTEM
- 4) PRESSURE RELIEF ASSEMBLY

5)

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7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	2/1R	RTLS:	2/1R
LIFTOFF:	2/1R	TAL:	2/1R
ONORBIT:	2/1R	AOA:	21/R
DEORBIT:	2/1R	ATO:	21/R
LANDING/SAFING:			/

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION:

PART NUMBER: MC284-0421

CAUSES: CONTAMINATION, VIBRATION, PIECE-PART STRUCTURAL FAILURE, MECHANICAL SHOCK, MATERIAL/MANUFACTURING DEFECT

### EFFECTS/RATIONALE:

WITH FIRST FAILURE, ONE FAILURE (PREMATURE RUPTURE OR LEAK OF BURST DISK) AWAY FROM POSSIBLE LOSS OF LIFE/VEHICLE DUE TO LOSS OF HELIUM PRESSURANT, INABILITY TO MAINTAIN PROP TANK PRESSURE, AND INABILITY TO USE OR DEPLETE PROP RESULTING IN POSSIBLE VIOLATIONS OF ORBITER ENTRY MASS PROPERTIES CONSTRAINTS AND PROP TANK LANDING WEIGHT CONSTRIANTS. FAILURES ALSO RESULT IN LEAKAGE OF PROP, FIRE/EXPLOSION HAZARD, AND HAZARD TO GROUND CREW.

HIGHEST CRITICALITY HDW/FUNC 10/06/87 DATE:

FLIGHT: 3/1R ABORT: 3/1R SUBSYSTEM: ARCS MDAC ID: 10026

PRESSURE RELIEF ASSEMBLY ITEM:

FAILURE MODE: RESTRICTED FLOW

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) PROP STOR & DIST SUBSYSTEM
- 4) PRESSURE RELIEF ASSEMBLY
- 5)
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		

REDUNDANCY SCREENS: A [ 3 ] B [NA ] C [ P ]

LOCATION:

PART NUMBER: MC284-0421

CAUSES: CONTAMINATION, FILTER BLOCKAGE

EFFECTS/RATIONALE:

FIRST FAILURE IS NO EFFECT. LOSS OF ALL REDUNDANCY (REGS) IS POSSIBLE LOSS OF LIFE/VEHICLE DUE TO OVERPRESSURIZATION AND POSSIBLE RUPTURE OF PROP TANKS AND LINES RESULTING IN FIRE/EXPLOSION HAZARD, AND HAZARD TO GROUND CREW.

DATE: 10/06/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 1/1
MDAC ID: 10027 ABORT: 1/1

ITEM: PRESSURE RELIEF ASSEMBLY

FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) PROP STOR & DIST SUBSYSTEM
- 4) PRESSURE RELIEF ASSEMBLY

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8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	1/1	RTLS:	1/1
LIFTOFF:	1/1	TAL:	1/1
ONORBIT:	1/1	AOA:	1/1
DEORBIT:	1/1	ATO:	1/1
LANDING/SAFING:	: 1/1		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC284-0421

CAUSES: HOUSING STRUCTURAL FAILURE, MATERIAL/MANUFACTURING

DEFECT, HIGH PRESSURE

#### EFFECTS/RATIONALE:

FIRST FAILURE IS POSSIBLE LOSS OF LIFE/VEHICLE. LOSS OF HELIUM PRESSURANT AND INABILITY TO MAINTAIN PROP TANK PRESSURE RESULTS IN INABILITY TO USE OR DEPLETE PROP AND POSSIBLE VIOLATIONS OF ORBITER ENTRY MASS PROPERTIES CONSTRAINTS AND PROP TANK LANDING WEIGHT CONSTRAINTS. FAILURE ALSO ALLOWS LEAKAGE OF PROP OR PROP VAPORS, CREATING FIRE/EXPLOSION HAZARD AND HAZARD TO GROUND CREW.

REFERENCES: 1) JSC 11174, 11.5 2) VS70-943099, 43CA, DA

REPORT DATE : 2/26/88 E-28

DATE: 10/06/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS

FLIGHT: 2/1R

MDAC ID:

10028

ABORT:

2/1R

ITEM:

PROP TANK ISOL VLVS 3/4/5

FAILURE MODE: RESTRICTED FLOW

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) PROP STOR & DIST SUBSYSTEM
- 4) PROP TANK ISOL VLVES 3/4/5

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6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	2/1R	TAL:	2/1R
ONORBIT:	2/1R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	3/3		-

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ F ]

LOCATION:

PART NUMBER: MC284-0430

CAUSES: CONTAMINATION, FILTER BLOCKAGE

#### EFFECTS/RATIONALE:

WITH RESTRICTED FLOW IN ONE 3/4/5 VALVE, ONE FAILURE (RESTRICTED FLOW OR FAILED CLOSED PARALLEL VALVE) AWAY FROM POSSIBLE LOSS OF LIFE/VEHICLE DUE TO IMPROPER FLOW RATE TO THRUSTERS. AN IMPROPER MISTURE RATIO OR INADEQUATE COOLING AS A RESULT OF RESTRICTED PROP FLOW COULD RESULT IN COMBUSTION CHAMBER OR NOZZLE EXTENSION BURN-THROUGH.

DATE: 10/07/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 1/1

MDAC ID: 10029 ABORT: 1/1

ITEM: PROP TANK ISOL VLV 1/2

FAILURE MODE: RELIEF DEVICE FAILS TO RELIEVE

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) PROP STOR & DIST SUBSYSTEM
- 4) PROP TANK ISOL VLV 1/2
- 5)
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	1/1	RTLS:	3/3
LIFTOFF:	1/1	TAL:	3/3
ONORBIT:	1/1	AOA:	3/3
DEORBIT:	1/1	ATO:	1/1
LANDING/SAFING:	1/1		- <b>,</b> -

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC284-0430

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE, VIBRATION, MATERIAL/MANUFACTURING DEFECT

#### EFFECTS/RATIONALE:

FIRST FALIURE IS POSSIBLE LOSS OF LIFE/VEHICLE DUE TO POSSIBLE RUPTURE OF DOWNSTREAM LINES, AND LOSS/LEAKAGE OF PROP RESULTING IN FIRE/EXPLOSION HAZARD AND HAZARD TO GROUND CREW. VALVES OPEN DURING ABORTS.

DATE: 10/07/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 2/1R MDAC ID: 10030 ABORT: 2/1R

ITEM: PROP TANK ISOL VLVS 3/4/5

FAILURE MODE: RELIEF DEVICE FAILS TO RELIEVE

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) PROP STOR & DIST SUBSYSTEM
- 4) PROP TANK ISOL VLVS 3/4/5

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6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	2/1R	RTLS:	3/3
LIFTOFF:	2/1R	TAL:	3/3
ONORBIT:	2/1R	AOA:	3/3
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	•		

LANDING/SAFING: 2/1R

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: MC284-0430

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE, VIBRATION,

MATERIAL/MANUFACTURING DEFECT

#### EFFECTS/RATIONALE:

FAILURE OF RELIEF VALVE IN ONE 3/4/5 VALVE IS UNDETECTABLE AND IS OF NO EFFECT. PARALLEL VALVE DEVICE WILL RELIEVE DOWNSTREAM PRESSURE. FAILURE OF DEVICES IN BOTH 3/4/5 VALVES IS POSSIBLE LOSS OF LIFE/VEHICLE DUE TO POSSIBLE RUPTURE OF DOWNSTREAM LINES, AND LOSS/LEAKAGE OF PROP RESULTING IN FIRE/EXPLOSION HAZARD AND HAZARD TO GROUND CREW. VALVES OPEN DURING ABORTS.

DATE:

10/07/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS MDAC ID:

10031

FLIGHT: 3/1R ABORT:

1/1

ITEM:

PROP TANK ISOL VLV 1/2

FAILURE MODE: FAILS MID-TRAVEL

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- PROP STOR & DIST SUBSYSTEM 3)
- PROP TANK ISOL VLV 1/2 4)

5)

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		-,

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: MC284-0430

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE,

MATERIAL/MANUFACTURING DEFECT, IMPROPER INPUT

## EFFECTS/RATIONALE:

WORST CASE EFFECTS ARE THE SAME AS THOSE FOR A FAILED CLOSED VALVE. FIRST FAILURE IS NO EFFECT. LOSS OF ALL REDUNDANCY IS POSSIBLE LOSS OF LIFE/VEHICLE DUE TO LOSS OF THRUSTERS, RESULTING IN INABILITY TO PERFORM ET SEP AND LOSS OF ENTRY CONTROL. FIRST FAILURE DURING RTLS OR TAL IS POSSIBLE LOSS OF LIFE/VEHICLE DUE TO POSSIBLE INABILITY TO COMPLETE ARCS DUMP.

DATE: 10/07/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 10032 ABORT: 2/1R

ITEM: PROP TANK ISOL VLVS 3/4/5

FAILURE MODE: FAILS MID-TRAVEL

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) PROP STOR & DIST SUBSYSTEM
- 4) PROP TANK ISOL VLVS 3/4/5
- 5)
- 6)
- 7) 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: MC284-0430

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE,

MATERIAL/MANUFACTURING DEFECT, IMPROPER INPUT

#### EFFECTS/RATIONALE:

WORST CASE EFFECTS ARE THE SAME AS THOSE FOR A FAILED CLOSED VALVE. FIRST FAILURE IS NO EFFECT. LOSS OF ALL REDUNDANCY IS POSSIBLE LOSS OF LIFE/VEHICLE DUE TO LOSS OF THRUSTERS, RESULTING IN INABILITY TO PERFORM ET SEP AND LOSS OF ENTRY CONTROL.

DATE: 10/08/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 10033 ABORT: 3/1R

ITEM: RCS CROSSFEED VLVS 1/2 & 3/4/5 FAILURE MODE: RELIEF DEVICE FAILS CLOSED

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) PROP STOR & DIST SUBSYSTEM
- 4) RCS CROSSFEED VLVS 1/2 & 3/4/5

5)

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	3/1R		•

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION:

PART NUMBER: MC284-0430

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE, VIBRATION, MATERIAL/MANUFACTURING DEFECT

#### EFFECTS/RATIONALE:

FIRST FAILURE IS NO EFFECT. LOSS OF ALL REDUNDANCY (ALL OTHER CROSSFEED VALVES) IS POSSIBLE LOSS OF LIFE/VEHICLE DUE TO OVERPRESSURIZATION AND POSSIBLE RUPTURE OF CROSSFEED LINES, RESULTING IN LOSS OF PROPELLANT, FIRE/EXPLOSION HAZARD, AND HAZARD TO GROUND CREW.

DATE: 10/08/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 2/2 ABORT: 1/1

ITEM: RCS CROSSFEED VLVS 1/2 & 3/4/5

FAILURE MODE: FAILS MID-TRAVEL

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) PROP STOR & DIST SUBSYSTEM
- 4) RCS CROSSFEED VLVS 1/2 & 3/4/5

5) 6)

7)

8) 9)

### CRITICALITIES

	TENER / PRINTS	ABORT	HDW/FUNC
FLIGHT PHASE	HDW/FUNC	ABURT	•
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/2R	TAL:	1/1
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC284-0430

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE,

MATERIAL/MANUFACTURING DEFECT, IMPROPER INPUT

## EFFECTS/RATIONALE:

WORST CASE EFFECTS ARE THE SAME AS THOSE FOR A FAILED CLOSED VALVE. FIRST FAILURE RESUTS IN POSSIBLE LOSS OF MISSION DUE TO LOSS OF CROSSFEED/INTERCONNECT CAPABILITY. FIRST FAILURE DURING RTLS OR TAL IS POSSIBLE LOSS OF LIFE/VEHICLE DUE TO LOSS OF RCS THRUSTERS FOR OMS PROP DUMPING, RESULTING IN AN IMCOMPLETE OMS DUMP.

REFERENCES: 1) JSC 11174, 11.5 2) VS70-943099, 43CD, DD

DATE: 10/09/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS

FLIGHT: 1/1 MDAC ID: 10035 ABORT: 1/1

ITEM: MANIFOLD 1-4 ISOL VALVES FAILURE MODE: RELIEF DEVICE FAILS CLOSED

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1-4 ISOL VALVES

5)

6)

7)

8) 9)

CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
1/1	RTLS:	3/3
1/1	TAL:	3/3
1/1	AOA:	3/3
1/1	ATO:	1/1
: 1/1		-, -
	1/1 1/1 1/1 1/1	1/1 RTLS: 1/1 TAL: 1/1 AOA: 1/1 ATO:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC284-0430

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE, VIBRATION, MATERIAL/MANUFACTURING DEFECT

### EFFECTS/RATIONALE:

FIRST FAILURE IS POSSIBLE LOSS OF LIFE/VEHICLE DUE TO POSSIBLE RUPTURE OF DOWNSTREAM LINES, AND LOSS/LEAKAGE OF PROP RESULTING IN FIRE/EXPLOSION HAZARD AND HAZARD TO GROUND CREW. VALVES OPEN DURING ABORTS.

DATE: 10/09/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 1/1 MDAC ID: 10036 ABORT: 1/1

ITEM: VERNIER MANIFOLD ISOL VALVE FAILURE MODE: RELIEF DEVICE FAILS CLOSED

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) PROP STOR & DIST SUBSYSTEM
- 4) VERNIER MANIFOLD ISOL VALVE
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
1/1	RTLS:	3/3
•	TAL:	3/3
	AOA:	3/3
1/1	ATO:	1/1
1/1		
	1/1 1/1 1/1 1/1	1/1 RTLS: 1/1 TAL: 1/1 AOA: 1/1 ATO:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC284-0420

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE, VIBRATION, MATERIAL/MANUFACTURING DEFECT

EFFECTS/RATIONALE:

FIRST FAILURE IS POSSIBLE LOSS OF LIFE/VEHICLE DUE TO POSSIBLE RUPTURE OF DOWNSTREAM LINES, AND LOSS/LEAKAGE OF PROP RESULTING IN FIRE/EXPLOSION HAZARD AND HAZARD TO GROUND CREW. VALVES OPEN DURING ABORTS.

DATE:

10/09/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS

FLIGHT: 3/1R

MDAC ID: 10037

ABORT:

1/1

ITEM:

MANIFOLD 1-4 ISOL VALVES

FAILURE MODE: FAILS MID-TRAVEL

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1-4 ISOL VALVES

5)

6)

7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		-,

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PART NUMBER: MC284-0430

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE,

MATERIAL/MANUFACTURING DEFECT, IMPROPER INPUT

#### EFFECTS/RATIONALE:

WORST CASE EFFECTS ARE THE SAME AS THOSE FOR A FAILED CLOSED VALVE. FIRST FAILURE IS NO EFFECT. LOSS OF ALL REDUNDANCY IS POSSIBLE LOSS OF LIFE/VEHICLE DUE TO LOSS OF THRUSTERS REQUIRED FOR ET SEP AND ENTRY CONTROL. FIRST FAILURE DURING RTLS OR TAL IS POSSIBLE LOSS OF LIFE/VEHICLE DUE TO LOSS OF ONE MANIFOLD AND POSSIBLE INABILITY TO COMPLETE ADEQUATE OMS AND/OR RCS DUMPS.

HIGHEST CRITICALITY HDW/FUNC 10/13/87 DATE: FLIGHT: 1/1 SUBSYSTEM: ARCS ABORT: 1/1 MDAC ID: 10038 THRUSTER BIPROP SOLENOID VALVE, PRIMARY, ALL AXES ITEM: FAILURE MODE: PREMATURE OPERATION, FAILS ON LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST BREAKDOWN HIERARCHY: 1) HARDWARE COMPONENTS 2) ASSEMBLIES 3) THRUSTER SUBSYSTEM 4) THRUSTER BIPROP SOLENOID VALVE, PRIMARY, ALL AXES 5) 6) 7)

CRITIC	'AL	TT	IES
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FLIGHT PHASE PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	HDW/FUNC 1/1 1/1 1/1 1/1 1/1	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 1/1 1/1 1/1 1/1
LANDING/SAFING:	1/1		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

8) 9)

PART NUMBER: MC467-0428

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE,

PREMATURE/CONTINUOUS/IMPROPER INPUT

## EFFECTS/RATIONALE:

FIRST FAILURE DURING FLIGHT COULD RESULT IN CONTACT WITH PAYLOAD DURING RENDEZVOUS, CAUSING LOSS OF VEHICLE OR EVA CREW. FIRST FAILURE DURING GROUND PHASES COULD RESULT IN LOSS OF GROUND CREW DUE TO EXPOSURE TO PROP VAPORS AND EXHAUST PLUME.

DATE: 10/13/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 1/1 MDAC ID: 10039 ABORT: 1/1

ITEM: THRUSTER BIPROP SOLENOID VLV, VERNIER, ALL AXES

FAILURE MODE: PREMATURE OPERATION, FAILS ON

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) THRUSTER SUBSYSTEM
- 4) THRUSTER BIPROP SOLENOID VLV, VERNIER, ALL AXES

5) 6)

7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	1/1	RTLS:	1/1
LIFTOFF:	1/1	TAL:	1/1
ONORBIT:	1/1	AOA:	1/1
DEORBIT:	1/1	ATO:	1/1
LANDING/SAFING:	1/1		-/ <b>-</b>

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC467-0029

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE,

PREMATURE/CONTINUOUS/IMPROPER INPUT

## EFFECTS/RATIONALE:

FIRST FAILURE DURING FLIGHT COULD RESULT IN CONTACT WITH PAYLOAD DURING RENDEZVOUS, CAUSING LOSS OF VEHICLE OR EVA CREW. FIRST FAILURE DURING GROUND PHASES COULD RESULT IN LOSS OF GROUND CREW DUE TO EXPOSURE TO PROP VAPORS AND EXHAUST PLUME.

HIGHEST CRITICALITY HDW/FUNC 10/13/87 DATE: FLIGHT: 1/1 SUBSYSTEM: ARCS 1/1 ABORT: MDAC ID: 10040 THRUSTER INJECTOR HEAD ASSY, PRIMARY ITEM: FAILURE MODE: RESTRICTED FLOW LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST BREAKDOWN HIERARCHY: 1) HARDWARE COMPONENTS 2) ASSEMBLIES 3) THRUSTER SUBSYSTEM 4) THRUSTER INJECTOR HEAD ASSY, PRIMARY 5) 6) 7) 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	1/1	TAL:	1/1
ONORBIT:	1/1	AOA:	1/1
DEORBIT:	1/1	ATO:	1/1
LANDING/SAFING:	•		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC467-0028

CAUSES: CONTAMINATION, PROP FREEZING

EFFECTS/RATIONALE:

FIRST FAILURE COULD RESULT IN LOSS OF LIFE/VEHICLE. IMPROPER MIXTURE RATIO OR INADEQUATE COOLING COULD RESULT IN COMBUSTION CHAMBER OR NOZZLE EXTENSION BURN-THROUGH.

DATE: 10/13/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 1/1

MDAC ID: 10041 ABORT: 1/1

ITEM: THRUSTER INJECTOR HEAD ASSY, PRIMARY FAILURE MODE: STRUCTURAL FAILURE, BURN-THROUGH

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) THRUSTER SUBSYSTEM
- 4) THRUSTER INJECTOR HEAD ASSY, PRIMARY

5)

6) 7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	1/1	RTLS:	1/1
LIFTOFF:	1/1	TAL:	1/1
ONORBIT:	1/1	AOA:	1/1
DEORBIT:	1/1	ATO:	1/1
LANDING/SAFING:	: 1/1		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC467-0028

CAUSES: PIECE-PART STRUCTURAL FAILURE, MATERIAL/MANUFACTURING DEFECT, COMBUSTION ANOMALIES, CONTAMINATION

### EFFECTS/RATIONALE:

FIRST FAILURE IS POSSIBLE LOSS OF LIFE/VEHICLE. MIXING OF MMH AND N204 IN INJECTOR, OR BURN-THROUGH OF INJECTOR RESULTS IN POSSIBLE FIRE/EXPLOSION AND DAMAGE TO VEHICLE.

HIGHEST CRITICALITY HDW/FUNC 10/26/87 DATE: FLIGHT: 1/1 SUBSYSTEM: FRCS 1/1 ABORT: MDAC ID: 10042

THRUSTER BIPROP SOLENOID VALVE, PRIMARY, ALL AXES ITEM: FAILURE MODE: DELAYED OPERATION, ONE VALVE OPENS SLOWLY OR LATE

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- THRUSTER SUBSYSTEM 3)

THRUSTER BIPROP SOLENOID VALVE, PRIMARY, ALL AXES 4)

5)

6)

7)

8) 9)

#### CRITICALITIES

PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT:	HDW/FUNC /NA 1/1 1/1 1/1	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 1/1 1/1 1/1 1/1
LANDING/SAFING:	: /NA		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC467-0028

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE,

MATERIAL/MANUFACTURING DEFECT, IMPROPER INPUT

## EFFECTS/RATIONALE:

FIRST FAILURE IS POSSIBLE LOSS OF LIFE/VEHICLE. DELAYED OPENING OF THE OXIDIZER VALVE COULD RESULT IN MIGRATION OF FUEL INTO THE OXIDIZER INJECTOR TUBE AND DETONATION WITHIN TUBE UPON OXIDIZER FLOW. RUPTURE OF VALVE ASSEMBLY DUE TO JET ZOTS REQUIRED IN LEAKAGE OF PROP, FIRE/EXPLOSION HAZARD, AND HAZARD TO GROUND CREW.

DATE: 10/26/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 1/1
MDAC ID: 10043 ABORT: 1/1

THRUSTER BIPROP SOLENOID VALVE, PRIMARY, ALL AXES FAILURE MODE: DELAYED OPERATION, ONE VALVE OPENS SLOWLY OR LATE

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) THRUSTER SUBSYSTEM
- 4) THRUSTER BIPROP SOLENOID VALVE, PRIMARY, ALL AXES

5) 6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	1/1
LIFTOFF:	1/1	TAL:	1/1
ONORBIT:	1/1	AOA:	$\frac{1}{1}$
DEORBIT:	1/1	ATO:	$\frac{1}{1}$
Landing/Safin	G: /NA		-/ -

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC467-0028

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE,

MATERIAL/MANUFACTURING DEFECT, IMPROPER INPUT

## EFFECTS/RATIONALE:

FIRST FAILURE IS POSSIBLE LOSS OF LIFE/VEHICLE. DELAYED OPENING OF THE OXIDIZER VALVE COULD RESULT IN MIGRATION OF FUEL INTO THE OXIDIZER INJECTOR TUBE AND DETONATION WITHIN TUBE UPON OXIDIZER FLOW. RUPTURE OF VALVE ASSEMBLY DUE TO JET ZOTS REQUIRED IN LEAKAGE OF PROP, FIRE/EXPLOSION HAZARD, AND HAZARD TO GROUND CREW.

HIGHEST CRITICALITY HDW/FUNC 9/28/87 DATE: FLIGHT: 1/1 SUBSYSTEM: FRCS 1/1 ABORT: MDAC ID: 10116 THRUSTER BIPROP SOLENOID VLV, PRIMARY, ALL AXES ITEM: FAILURE MODE: FAILS ON, PREMATURE OPERATION LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST BREAKDOWN HIERARCHY: 1) HARDWARE COMPONENTS 2) ASSEMBLIES 3) THRUSTER SUBSYSTEM 4) THRUSTER BIPROP SOLENOID VLV, PRIMARY, ALL AXES 5) 6) 7)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	1/1	RTLS:	1/1
LIFTOFF:	1/1	TAL:	1/1
ONORBIT:	1/1	AOA:	1/1
DEORBIT:	1/1	ATO:	1/1
LANDING/SAFING	•		
•	·		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

8) 9)

PART NUMBER: MC467-0028

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE,

PREMATURE/CONTINUOUS/IMPROPER INPUT

## EFFECTS/RATIONALE:

FIRST FAILURE DURING FLIGHT COULD RESULT IN CONTACT WITH PAYLOAD DURING RENDEZVOUS, CAUSING LOSS OF VEHICLE OR EVA CREW. FIRST FAILURE DURING GROUND PHASES COULD RESULT IN LOSS OF GROUND CREW DUE TO EXPOSURE TO PROP VAPORS AND EXHAUST PLUME.

REFERENCES: 1) JSC 11174, 11.6 2) VS70-942099, 42BN, BT

DATE: 10/13/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 1/1 MDAC ID: 10138 ABORT: 1/1

ITEM: THRUSTER BIPROP SOLENOID VALVE, PRIMARY, ALL AXES

FAILURE MODE: PREMATURE OPERATION, FAILS ON

LEAD ANALYST: C.D. PRUST SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) HARDWARE COMPONENTS
- 2) ASSEMBLIES
- 3) THRUSTER SUBSYSTEM
- 4) THRUSTER BIPROP SOLENOID VALVE, PRIMARY, ALL AXES

5) 6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	1/1	RTLS:	1/1
LIFTOFF:	1/1	TAL:	1/1
ONORBIT:	1/1	AOA:	1/1
DEORBIT:	1/1	ATO:	1/1
LANDING/SAFING:	1/1		_, _

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER: MC467-0428

CAUSES: CONTAMINATION, PIECE-PART STRUCTURAL FAILURE,

PREMATURE/CONTINUOUS/IMPROPER INPUT

#### EFFECTS/RATIONALE:

FIRST FAILURE DURING FLIGHT COULD RESULT IN CONTACT WITH PAYLOAD DURING RENDEZVOUS, CAUSING LOSS OF VEHICLE OR EVA CREW. FIRST FAILURE DURING GROUND PHASES COULD RESULT IN LOSS OF GROUND CREW DUE TO EXPOSURE TO PROP VAPORS AND EXHAUST PLUME.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R ABORT: 3/1R SUBSYSTEM: FRCS MDAC ID: 11001

ITEM: FUSE, 1A FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
  4) MANIFOLD 5, OX & FU ISOL VLVS

5) FUSE, 1A

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	: 3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: PNL 08 S34 PART NUMBER: 33V73A8 F39

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE: LOSE CAPABILITY TO INHIBIT THE GROUND DRIVER MANUALLY. GROUND DRIVER CAN STILL BE INHIBITED BY MDM FF2. LOSS OF THIS REDUNDANCY PREVENTS CLOSING THE ISOLATION VALVE, WHICH COULD PREVENT ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11002 ABORT: 3/1R

ITEM: FUSE, 1A FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) FUSE, 1A

6)

7)

8) 9)

#### CRITICALITIES

77777 / 200000
HDW/FUNC
3/1R
3/1R
3/1R
3/1R
-,

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: PNL 08 S34 PART NUMBER: 33V73A8 F44

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY OPEN OR CLOSE THE ISOLATION VALVE WITH SWITCH 34. GPC CAPABILITY TO CLOSE VALVE IS STILL OPERABLE. GPC CAPABILITY TO OPEN VALVE IS NOT OPERABLE. THE ISOLATION VALVE THEREFORE CANNOT BE CLOSED, WHICH COULD PREVENT ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R ABORT: 3/1R SUBSYSTEM: FRCS MDAC ID: 11003

MANIFOLD 5, OX & FU ISOL VLV SWITCH ITEM:

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) MANIFOLD 5, OX & FU ISOL VLV SWITCH

6)

7) 8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: PNL 08 S34 PART NUMBER: 33V73A8 S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE ISOLATION VALVE WITH THE SWITCH. GPC PROVIDES REDUNDANCY. INABILITY TO CLOSE ISOLATION VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH LOSS OF HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11004 ABORT: 3/1R

ITEM: MANIFOLD 5, OX & FU ISOL VLV SWITCH FAILURE MODE: SWITCH FAILS CLOSED (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) MANIFOLD 5, OX & FU ISOL VLV SWITCH

6)

7)

8)

9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		٠, ؎.

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: PNL 08 S34
PART NUMBER: 33V73A8 S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVE IF SWITCH FAILED ACROSS CLOSE CONTACTS. INABILITY TO OPEN THE VALVE CAUSES LOSS OF VERNIERS THUS MISSION OPERATIONS (2/2). SWITCH FAILED SHORT ACROSS OPEN CONTACTS CAUSES INABILITY TO ISOLATE A THRUSTER LEAK (3/1R).

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/2
MDAC ID: 11005 ABORT: 2/2

ITEM: MANIFOLD 5, OX & FU ISOL VLV SWITCH

FAILURE MODE: SWITCH SHORTS ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) MANIFOLD 5, OX & FU ISOL VLV SWITCH

6)

7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	2/2	AOA:	3/1R
DEORBIT:	3/1R	ATO:	2/2
LANDING/SAFING:			

LANDING/SAFING: 3/1R

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 08 S34
PART NUMBER: 33V73A8 S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVE IF SWITCH FAILED ACROSS CLOSE CONTACTS. INABILITY TO OPEN THE VALVE CAUSES LOSS OF VERNIERS THUS MISSION OPERATIONS (2/2). SWITCH FAILED SHORT ACROSS OPEN CONTACTS CAUSES INABILITY TO ISOLATE A THRUSTER LEAK. LEAK.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11006 ABORT: 3/1R

ITEM: MANIFOLD 5, OX & FU ISOL VLV SWITCH

FAILURE MODE: SWITCH INADVERTENTLY OPENS/SHORTS (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) MANIFOLD 5, OX & FU ISOL VLV SWITCH

6)

7)

8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		,

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: PNL 08 S34
PART NUMBER: 33V73A8 S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

INADVERTENTLY OPENING THE ISOLATION VALVE PREVENTS ISOLATION OF A LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R ABORT: 3/1R SUBSYSTEM: FRCS MDAC ID: 11007

MANIFOLD 5, OX & FU ISOL VLV SWITCH ITEM:

FAILURE MODE: SHORT TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS 5) MANIFOLD 5, OX & FU ISOL VLV SWITCH

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S34 PART NUMBER: 33V73A8 S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

SHORT TO CASE WILL BLOW THE 1 AMP FUSE. LOSE CAPABILITY TO CLOSE ISOLATION VALVE WITH THE SWITCH. GPC PROVIDES REDUNDANCY. INABILITY TO CLOSE ISOLATION VALVE PREVENTS ISOLATION OF A LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY MAY CAUSE LOSS OF CREW/VEHICLE.

DATE:

10/01/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS MDAC ID:

FLIGHT: 3/2R

11008

ABORT:

3/2R

ITEM:

RESISTOR, 1.2K 2W

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) RESISTOR, 1.2K 2W

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		-,

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 83V76A18 J2-104, J2-83

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO MONITOR ISOLATION VALVE OPEN OR CLOSE STATUS. MANIFOLD STATUS MONITOR (MDM FF3) PROVIDES LATEST MICROSWITCH DISCRETE INFORMATION OF THE VALVES. VRCS MAY NOT BE USED IF VALVES THOUGHT TO BE CLOSED (LOSS OF MISSION). LOSE INHIBITS TO THE TYPE III "OPEN" AND "CLOSE" HYBRID DRIVERS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 11009 ABORT: 3/3

ITEM: RESISTOR, 1.2K 2W

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) RESISTOR, 1.2K 2W

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 83V76A18 J2-104, J2-83

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3 MDAC ID: 11010 ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) RESISTOR, 5.1K 1/4W

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	3/3	
LIFTOFF:	3/3	TAL:	3/3	
ONORBIT:	3/3	AOA:	3/3	
DEORBIT:	3/3	ATO:	3/3	
LANDING/SAFING	: 3/3		-/	

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3 PART NUMBER: 83V76A24 J14-94

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

NO EFFECT. LOSE CAPABILITY TO MONITOR RPC 28 STATUS WITH MDM OF3. DATA NOT MISSION CRITICAL.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: FRCS MDAC ID: 11011

RESISTOR, 5.1K 1/4W ITEM:

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS 5) RESISTOR, 5.1K 1/4W

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
PHOMPII.	-/ -		•

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3 PART NUMBER: 83V76A24 J14-95

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE CAPABILITY TO MONITOR RPC 29 STATUS WITH MDM

OF3. DATA NOT MISSION CRITICAL.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11012 ABORT: 3/2R

ITEM: RESISTOR, 5.1K 1/4W

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) RESISTOR, 5.1K 1/4W
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		٠,

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, LCA 3 PART NUMBER: 83V76A18 J1-88

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE FUEL CLOSED DISCRETE INPUT TO THE MANIFOLD STATUS MONITOR (MDM FF3). MANIFOLD STATUS MONITOR MAY ISSUE A DILEMMA STATE AND SET THE MANIFOLD STATUS TO CLOSED. KEYBOARD ENTRIES ARE REQUIRED TO OVERRIDE THE VALVE STATUS TO OPEN. TALKBACK INDICATOR PROVIDES REDUNDANCY. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF VRCS (MISSION) IF VALVES THOUGHT TO BE CLOSED.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/2R SUBSYSTEM: FRCS 3/2R ABORT: MDAC ID: 11013

ITEM: RESISTOR, 5.1K 1/4W

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
  4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) RESISTOR, 5.1K 1/4W

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	: 3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, LCA 3
PART NUMBER: 83V76A18 J1-91

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE OXIDIZER OPEN DISCRETE INPUT TO THE MANIFOLD STATUS MONITOR (MDM FF3). MANIFOLD STATUS MONITOR MAY ISSUE A DILEMMA STATE AND SET THE MANIFOLD STATUS TO CLOSED. KEYBOARD ENTRIES ARE REQUIRED TO OVERRIDE THE MANIFOLD STATUS TO OPEN. TALKBACK INDICATOR PROVIDES REDUNDANCY. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF VRCS (MISSION) IF VALVES THOUGHT TO BE CLOSED.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11014 ABORT: 3/2R

ITEM: RESISTOR, 5.1K 1/4W

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) RESISTOR, 5.1K 1/4W

6)

7) 8)

9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDM / Printo
	•		HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		-,

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, LCA 3 PART NUMBER: 83V76A18 J1-90

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE FUEL OPEN DISCRETE INPUT TO THE MANIFOLD STATUS MONITOR (MDM FF3). MANIFOLD STATUS MONITOR MAY ISSUE A DILEMMA STATE AND SET THE MANIFOLD STATUS TO CLOSED. KEYBOARD ENTRIES ARE REQUIRED TO OVERRIDE THE MANIFOLD STATUS TO OPEN. TALKBACK INDICATOR PROVIDES REDUNDANCY. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF VRCS (MISSION) IF VALVES THOUGHT TO BE CLOSED.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11015 ABORT: 3/2R

ITEM: RESISTOR, 5.1K 1/4W

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) RESISTOR, 5.1K 1/4W
- 6)
- 7) 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, LCA 3 PART NUMBER: 83V76A18 J1-89

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE OXIDIZER CLOSE DISCRETE INPUT TO THE MANIFOLD STATUS MONITOR (MDM FF3). MANIFOLD STATUS MONITOR MAY ISSUE A DILEMMA STATE AND SET THE MANIFOLD STATUS TO CLOSED. KEYBOARD ENTRIES ARE REQUIRED TO OVERRIDE THE MANIFOLD STATUS TO OPEN. TALKBACK INDICATOR PROVIDES REDUNDANCY. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF VRCS (MISSION) IF VALVES THOUGHT TO BE CLOSED.

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11016 ABORT: 3/2R

ITEM: EVENT INDICATOR

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
  4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) EVENT INDICATOR

6)

7)

8) 9)

CRITICALITIES

	IDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		-,

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S34 PART NUMBER: 33V73A8 DS20

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO VISUALLY MONITOR ISOLATION VALVE OPEN OR CLOSE STATUS. REDUNDANCY IS PROVIDED WITH THE MANIFOLD STATUS MONITOR (MDM FF3). LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF VRCS (MISSION) IF VALVES THOUGHT TO BE CLOSED.

10/01/87 DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS

FLIGHT: 3/2R

MDAC ID: 11017

ABORT:

3/2R

ITEM:

EVENT INDICATOR

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- PROP STOR & DIST SUBSYSTEM 3)
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) EVENT INDICATOR

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PNL 08 S34

PART NUMBER: 33V73A8 DS20

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE CAPABILITY TO VISUALLY MONITOR THE ISOLATION VALVE OPEN OR CLOSE STATUS. REDUNDANCY IS PROVIDED WITH THE MANIFOLD STATUS MONITOR (MDM FF3). LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF VRCS (MISSION) IF VALVES THOUGHT TO BE CLOSED.

DATE:

10/01/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS

FLIGHT: 3/1R

MDAC ID: 11018

ABORT: 3/1R

ITEM:

CONTROLLER, REMOTE POWER

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- CONTROLLER, REMOTE POWER 5)

6)

7)

8)

9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		,

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AV BAY 6, PCA 3 PART NUMBER: 83V76A24 RPC28

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE ISOLATION VALVE. INABILITY TO CLOSE ISOLATION VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE. FAILURE DETECTABLE WITH MDM OF 3.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: FRCS MDAC ID: 11019

CONTROLLER, REMOTE POWER ITEM:

FAILURE MODE: FAILS HIGH

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) CONTROLLER, REMOTE POWER
- 6)
- 7)
- 8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3 PART NUMBER: 83V76A24 RPC28

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE INHIBITS TO THE TYPE III "CLOSE" DRIVER.

DETECTABLE WITH MDM OF3.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/2 MDAC ID: 11020 ABORT: 2/2

ITEM: CONTROLLER, REMOTE POWER

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) CONTROLLER, REMOTE POWER

6)

7)

8)

9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3 PART NUMBER: 83V76A24 RPC29

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVE. INABILITY TO OPEN ISOLATION VALVE PREVENTS VRCS OPERATION (LOSS OF MISSION). DETECTABLE WITH MDM OF1.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/3 SUBSYSTEM: FRCS 3/3 ABORT: MDAC ID: 11021

ITEM: CONTROLLER, REMOTE POWER

FAILURE MODE: FAILS HIGH

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
  4) MANIFOLD 5, OX & FU ISOL VLVS
  5) CONTROLLER, REMOTE POWER

6)

7)

8) 9)

CRITICALITIES

ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 3/3 3/3 3/3 3/3
	RTLS: TAL: AOA:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3 PART NUMBER: 83V76A24 RPC29

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE INHIBIT TO TYPE III "OPEN" DRIVER. DETECTABLE

WITH MDM OF1.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: FRCS

FLIGHT: 3/2R MDAC ID: 11022 ABORT: 3/2R

ITEM: DRIVER, HYBRID FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS

5) DRIVER, HYBRID

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		-/

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 83V76A18R J4-53 TYPE II

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE VISUAL "CLOSE" INDICATION OF VALVE CLOSURE. ALSO LOSE AN INHIBIT TO THE TYPE III "CLOSE" DRIVER. THE MANIFOLD STATUS MONITOR (MDM FF3) PROVIDES VALVE POSITION DATA. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF VRCS (MISSION) IF VALVES THOUGHT TO BE CLOSED.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R SUBSYSTEM: FRCS ABORT: 3/1R MDAC ID: 11023

DRIVER, HYBRID ITEM: FAILURE MODE: FAILS HIGH

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS 5) DRIVER, HYBRID

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	: 3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 83V76A18R J4-53 TYPE II

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

WITH THE VALVE OPEN, TALKBACK WILL DISPLAY BARBERPOLE. VALVE STATUS CAN BE MONITORED BY MDM FF3. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF VRCS (MISSION) IF VALVES THOUGHT TO BE CLOSED. ALSO LOSE AN INHIBIT TO THE TYPE III "CLOSE" DRIVER SO THAT IT CANNOT BE TURNED ON. THIS PREVENTS CLOSURE OF THE VALVE MANUALLY OR WITH THE GPC AND WILL NOT ALLOW ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11024 ABORT: 3/2R

ITEM: DRIVER, HYBRID FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DRIVER, HYBRID

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 83V76A18R J4-55 TYPE II

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE VISUAL "OPEN" INDICATION OF VALVE. ALSO LOSE AN INHIBIT TO THE TYPE III "OPEN" DRIVER. THE MANIFOLD STATUS MONITOR (MDM FF3) PROVIDES VALVE POSITION DATA. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF VRCS (MISSION) IF VALVES THOUGHT TO BE CLOSED.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/2
MDAC ID: 11025 ABORT: 2/2

ITEM: DRIVER, HYBRID FAILURE MODE: FAILS HIGH

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DRIVER, HYBRID
- 6)
- 7)
- 8)

9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 83V76A18R J4-55 TYPE II

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

WITH THE VALVE CLOSED, TALKBACK WILL DISPLAY BARBERPOLE. VALVE STATUS CAN BE MONITORED BY MDM FF3. ALSO LOSE AN INHIBIT TO THE TYPE III "OPEN" DRIVER SO THAT IT CANNOT BE TURNED ON, THUS NOT ALLOWING THE VALVE TO BE OPENED (LOSS OF MISSION).

HIGHEST CRITICALITY HDW/FUNC

DATE: 10/01/87 SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11026 ABORT: 3/1R

ITEM: DRIVER, HYBRID FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DRIVER, HYBRID

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		•

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 83V76A18R J5-K, L TYPE III

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE THE ISOLATION VALVE. THIS PREVENTS ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 11027 ABORT: 3/3

ITEM: DRIVER, HYBRID FAILURE MODE: FAILS HIGH

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DRIVER, HYBRID
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 83V76A18R J5-K, L TYPE III

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE INHIBITS REQUIRED TO CLOSE THE ISOLATION VALVE. THE GROUND DRIVER MUST BE TURNED ON FOR VALVE MOVEMENT. IF VALVE IS ATTEMPTED TO BE OPENED, BOTH SOLENOIDS WILL CONDUCT (WITH PROPER GROUND DRIVER STIMULI). WITH BOTH SOLENOID ENERGIZED THE VALVE WILL TRANSFER TO OR REMAIN OPEN. VALVE CAN BE CLOSED WITH PROPER GROUND DRIVER STIMULI.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11028 ABORT: 3/1R

ITEM: DRIVER, HYBRID FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DRIVER, HYBRID
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		•

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 83V76A18R J4-71 TYPE I

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE ISOLATION VALVE MANUALLY OR WITH GPC. ALSO LOSE AN INHIBIT TO OPEN THE ISOLATION VALVE. INABILITY TO CLOSE ISOLATION VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/2 MDAC ID: 11029 ABORT: 2/2

ITEM: DRIVER, HYBRID FAILURE MODE: FAILS HIGH

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DRIVER, HYBRID
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 83V76A18R J4-71 TYPE I

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVE. ALSO LOSE INHIBIT TO TURN ON RPC 28. INABILITY TO OPEN ISOLATION VALVE PREVENTS VRCS OPERATION (LOSS OF MISSION).

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/2 MDAC ID: 11030 ABORT: 2/2

ITEM: DRIVER, HYBRID FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
  3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DRIVER, HYBRID
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING:	3/3		-/ -

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 83V76A18R J4-51 TYPE I

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVE. INABILITY TO OPEN ISOLATION VALVE PREVENTS VRCS OPERATION (LOSS OF MISSION).

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: FRCS MDAC ID: 11031

DRIVER, HYBRID ITEM: FAILURE MODE: FAILS HIGH

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DRIVER, HYBRID
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 83V76A18R J4-51 TYPE I

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE INHIBIT TO TURN ON RPC 29. OTHER INHIBITS

REQUIRED TO OPEN VALVE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/2 MDAC ID: 11032 ABORT: 2/2

ITEM: DRIVER, HYBRID FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DRIVER, HYBRID

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	3/3	
LIFTOFF:	3/3	TAL:	3/3	
ONORBIT:	2/2	AOA:	3/3	
DEORBIT:	3/3	ATO:	2/2	
LANDING/SAFING:	3/3		, -	

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 83V76A18R J5-Y TYPE III

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVE. INABILITY TO OPEN THIS VALVE PREVENTS VRCS OPERATION (LOSS OF MISSION).

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11033 ABORT: 3/1R

ITEM: DRIVER, HYBRID FAILURE MODE: FAILS HIGH

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DRIVER, HYBRID
- 6)
- 7)
- 8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUN	INC ABORT	FUNC
PRELAUNCH:	LS: 3/1R	RTLS:	1R
LIFTOFF:	L: 3/1R	TAL:	1R
ONORBIT:	A: 3/1R	AOA:	1R
DEORBIT:	O: 3/1R	ATO:	1R
LANDING/SAFING		₹	
LANDING/SAFING		₹	

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 83V76A18R J5-Y TYPE III

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE ISOLATION VALVE (WITH BOTH SOLENOIDS ENERGIZED, VALVE WILL TRANSFER OR STAY OPEN). INABILITY TO CLOSE VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/2 MDAC ID: 11034 ABORT: 2/2

ITEM: DRIVER, HYBRID FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DRIVER, HYBRID

6)

7)

8) 9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING:	3/3		-, -

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA

PART NUMBER: 83V76A18R J5-G TYPE IV

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

WITH VALVE CLOSED, LOSE CAPABILITY TO OPEN ISOLATION VALVE. INABILITY TO OPEN ISOLATION VALVE PREVENTS VRCS OPERATION (LOSS OF MISSION). WITH VALVE OPEN, LOSE CAPABILITY TO CLOSE ISOLATION VALVE. INABILITY TO CLOSE ISOLATION VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE (3/1R, PNP).

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: FRCS MDAC ID: 11035

DRIVER, HYBRID ITEM: FAILURE MODE: FAILS HIGH

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DRIVER, HYBRID
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA

PART NUMBER: 83V76A18R J5-G TYPE IV

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSS INHIBIT FROM SWITCH 34 AND GPC INHIBITS FROM MDM FF2 TO TURN THE DRIVER ON. MANUAL AND GPC VALVE MOVEMENT STILL OPERABLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3 MDAC ID: 11036 ABORT: 3/3

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
  4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 08 S34 PART NUMBER: 33V73A8 J4-16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11037 ABORT: 3/2R

ITEM: DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

# CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S34
PART NUMBER: 33V73A8 J4-16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVE MANUALLY. GPC OPEN/CLOSE COMMANDS STILL OPERABLE. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF MISSION.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3 MDAC ID: 11038 ABORT: 3/3

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
  4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE

6)

7)

8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		, -

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 08 S34 PART NUMBER: 33V73A8 J6-60

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11039 ABORT: 3/2R

ITEM: DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S34
PART NUMBER: 33V73A8 J6-60

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVE MANUALLY. GPC OPEN/CLOSE COMMANDS STILL OPERABLE. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF MISSION.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11044 ABORT: 3/1R

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	: 3/1R		-

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, LCA 3 PART NUMBER: 83V76A18 J2-87

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY CLOSE THE ISOLATION VALVE. ALSO LOSE AN INHIBIT TO OPEN THE ISOLATION VALVE. GPC COMMANDS FOR OPEN/CLOSE STILL OEPRABLE. LOSS OF ALL REDUNDANCY TO CLOSE VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 11045 ABORT: 3/3

ITEM: DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3
PART NUMBER: 83V76A18 J2-87

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM MDM FF1 STIMULI. LOSE MANUAL

CLOSE INHIBIT TO THE TYPE III "CLOSE" DRIVER.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11046 ABORT: 3/1R

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, LCA 3 PART NUMBER: 83V76A18 J1-93

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE GPC CAPABILITY TO CLOSE THE ISOLATION VALVE. MANUAL COMMAND FOR OPEN/CLOSE STILL OPERABLE FROM SWITCH 34. LOSS OF REDUNDANCY TO CLOSE VALVE PREVENTS ISOLATION OF THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 11047 ABORT: 3/3

ITEM: DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	•		·

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3
PART NUMBER: 83V76A18 J1-93

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM SWITCH STIMULI.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11048 ABORT: 3/2R

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AV BAY 6, PCA 3 PART NUMBER: 83V76A24 J13-6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVE MANUALLY. GPC OPEN/CLOSE COMMANDS STILL OPERABLE. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF MISSION.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 11049 ABORT: 3/3

ITEM: DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3
PART NUMBER: 83V76A24 J13-6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM MDM FF3 STIMULI. LOSE EXCLUSIVE GPC OPEN INHIBIT TO THE TYPE III "OPEN" DRIVER FROM MDM FF1 (MDM FF3 ALLOWED TO INHIBIT THE TYPE III "OPEN" DRIVER).

HIGHEST CRITICALITY HDW/FUNC

DATE: 10/01/87 SUBSYSTEM: FRCS FLIGHT: 3/2R ABORT: 3/2R MDAC ID: 11050

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

### CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/3	RTLS:	3/3
3/3	TAL:	3/3
3/2R	AOA:	3/3
3/3	ATO:	3/2R
3/3		,
	3/3 3/3 3/2R 3/3	3/3 RTLS: 3/3 TAL: 3/2R AOA: 3/3 ATO:

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AV BAY 6, PCA 3 PART NUMBER: 83V76A24 J13-94

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVE WITH GPC. MANUAL OPEN/CLOSE COMMANDS STILL OPERABLE. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF MISSION.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE: FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: FRCS MDAC ID: 11051

DIODE ITEM:

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
  5) DIODE
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

<b>-</b>	HDW/FUNC	ABORT RTLS:	HDW/FUNC 3/3
PRELAUNCH: LIFTOFF:	3/3 3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3 PART NUMBER: 83V76A24 J13-94

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM SWITCH STIMULI.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11052 ABORT: 3/2R

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

## CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/3	RTLS:	3/3
3/3	TAL:	3/3
3/2R	AOA:	3/3
3/3	ATO:	3/2R
3/3		J, 22.
	3/3 3/3 3/2R 3/3	3/3 RTLS: 3/3 TAL: 3/2R AOA: 3/3 ATO:

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, PCA 3 PART NUMBER: 83V76A24 J13-95

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVE MANUALLY. GPC OPEN/CLOSE COMMANDS STILL OPERABLE. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF MISSION.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 11053 ABORT: 3/3

ITEM: DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	•		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3 PART NUMBER: 83V76A24 J13-95

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM MDM FF1 STIMULI.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11054 ABORT: 3/2R

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		-,

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AV BAY 6, PCA 3 PART NUMBER: 83V76A24 J13-1

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

LOSE GPC CAPABILITY TO OPEN ISOLATION VALVE. MANUAL OPEN/CLOSE COMMANDS FROM SWITCH 34 STILL OPERABLE. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF MISSION.

REFERENCES: ECN 102-8023A

REPORT DATE : 2/26/88 E-96

C-2

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE: FLIGHT: 3/3 SUBSYSTEM: FRCS 3/3 ABORT: MDAC ID: 11055 DIODE ITEM: FAILURE MODE: FAILS SHORT LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST BREAKDOWN HIERARCHY: 1) ELECTRICAL COMPONENTS 2) CONTROLS 3) PROP STOR & DIST SUBSYSTEM 4) MANIFOLD 5, OX & FU ISOL VLVS 5) DIODE 6) 7) 8)

CRITICALITIES

42/2 2 2 41			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3
PART NUMBER: 83V76A24 J13-1

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

9)

EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM SWITCH STIMULI.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R ABORT: 3/2R MDAC ID: 11056

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7) 8)
- 9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08, S34 PART NUMBER: 33V73A8 J4-8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

LOSE CAPABILITY TO MONITOR OPEN VALVE STATUS VISUALLY. MANIFOLD STATUS MONITOR (MDM FF3) PROVIDES REDUNDANCY FOR VALVE STATUS. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF VRCS (MISSION) IF VALVES THOUGHT TO BE CLOSED.

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: FRCS MDAC ID: 11057

ITEM: DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
  4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7) 8)
- 9)

# CRITICALITIES

	CRITICA	TITITIO	
FLIGHT PHASE PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	HDW/FUNC 3/3 3/3 3/3 3/3	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 3/3 3/3 3/3 3/3

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 08, S34 PART NUMBER: 33V73A8 J4-8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM SWITCH STIMULI.

DATE:

10/01/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS MDAC ID: 11058

FLIGHT: 3/2R ABORT: 3/2R

ITEM:

DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- DIODE

6)

7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3 3/2R
LANDING/SAFING:	3/3		3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08, S34

PART NUMBER: 33V73A8 J4-6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

LOSE CAPABILITY TO MONITOR CLOSE VALVE STATUS VISUALLY. MANIFOLD STATUS MONITOR (MDM FF3) PROVIDES REDUNDANCY FOR VALVE STATUS. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF VRCS (MISSION) IF VALVES THOUGHT TO BE CLOSED.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: FRCS FLIGHT: 3/3

SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 11059 ABORT: 3/3

ITEM: DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:			

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 08, S34
PART NUMBER: 33V73A8 J4-6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11060 ABORT: 3/1R

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7) 8)
- 9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		-/

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AV BAY 6, PCA 3 PART NUMBER: 83V76A24 J13-2

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE ISOLATION VALVE MANUALLY. GPC OPEN/CLOSE COMMANDS STILL OPERABLE. LOSS OF REDUNDANCY TO CLOSE VALVE PREVENTS ISOLATION OF THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: FRCS MDAC ID: 11061

DIODE ITEM:

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	3/3	
LIFTOFF:	3/3	TAL:	3/3	
ONORBIT:	3/3	AOA:	3/3	
DEORBIT:	3/3	ATO:	3/3	
LANDING/SAFING:	3/3			

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3 PART NUMBER: 83V76A24 J13-2

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM MDM FF3 STIMULI. LOSE MANUAL CLOSE INHIBIT TO THE TYPE I (J4-71) DRIVER WITH MDM FF3 STIMULI.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11062 ABORT: 3/1R

ITEM:

DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		•
	PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT:	PRELAUNCH: 3/1R LIFTOFF: 3/1R ONORBIT: 3/1R DEORBIT: 3/1R	PRELAUNCH: 3/1R RTLS: LIFTOFF: 3/1R TAL: ONORBIT: 3/1R AOA: DEORBIT: 3/1R ATO:

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AV BAY 6, PCA 3 PART NUMBER: 83V76A24 J13-3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE ISOLATION VALVE WITH GPC. MANUAL OPEN/CLOSE COMMANDS FROM SWITCH 34 STILL OPERABLE. LOSS OF ALL REDUNDANCY TO CLOSE VALVE PREVENTS ISOLATION OF THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: FRCS FLIGHT: 3/3

MDAC ID: 11063 ABORT: 3/3

ITEM: DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3 PART NUMBER: 83V76A24 J13-3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM SWITCH STIMULI.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11064 ABORT: 3/1R

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		,

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

AV BAY 6, PCA 3 LOCATION: PART NUMBER: 83V76A24 J7-R

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY INHIBIT THE DRIVER TO GROUND, THUS PREVENTING THE VALVE TO OPEN OR CLOSE. GPC CAPABILITY TO INHIBIT GROUND DRIVER STILL OPERABLE. LOSS OF THIS REDUNDANCY TO CLOSE THE ISOLATION VALVE PREVENTS ISOLATION OF THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87 FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: FRCS MDAC ID: 11065 ITEM: DIODE FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
  3) PROP STOR & DIST SUBSYSTEM
  4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7) 8)
- 9)

#### CRITICALITIES

IDW/FUNC
3/3
3/3
3/3
3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3
PART NUMBER: 83V76A24 J7-R

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM MDM FF2 STIMULI.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11066 ABORT: 3/1R

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		-/

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AV BAY 6, PCA 3
PART NUMBER: 83V76A24 J7-S

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

LOSE THE GPC CLOSE INHIBIT TO THE GROUND DRIVER, WHICH PREVENTS THE VALVE TO CLOSE. MANUAL INHIBIT AND GPC OPEN INHIBIT STILL OPERABLE. LOSS OF REDUNDANCY TO CLOSE THE ISOLATION VALVE PREVENTS ISOLATION OF THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY RESULT IN LOSS OF CREW/VEHICLE.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: FRCS MDAC ID: 11067

ITEM: DIODE

FAILURE MODE: FAILS HIGH

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3 PART NUMBER: 83V76A24 J7-S

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM SWITCH 34 AND MDM FF2 "OPEN" STIMULI.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11068 ABORT: 3/2R

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		-,

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, PCA 3 PART NUMBER: 83V76A24 J7-T

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

LOSE THE GPC OPEN INHIBIT TO THE GROUND DRIVER, WHICH PREVENTS THE VALVE TO BE OPENED. MANUAL INHIBIT AND GPC CLOSE INHIBIT STILL OPERABLE. LOSS OF REDUNDANCY TO OPEN THE ISOLATION VALVES MAY CAUSE LOSS OF MISSION.

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: FRCS MDAC ID: 11069

ITEM: DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
  4) MANIFOLD 5, OX & FU ISOL VLVS
  5) DIODE

6)

7) 8)

9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	•		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3 PART NUMBER: 83V76A24 J7-T

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM SWITCH 34 AND MDM FF2 "CLOSE"

STIMULI.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/2 MDAC ID: 11070 ABORT: 2/2

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
  4) MANIFOLD 5, OX & FU ISOL VLVS
  5) DIODE
- 6)
- 7)
- 8)
- 9)

# CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING:	3/3		-/ -

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3 PART NUMBER: 83V76A24 J7-e

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVES EITHER MANUALLY OR WITH GPC. THIS CAUSES LOSS OF MISSION OPERATIONS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 11071 ABORT: 3/3

ITEM: DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3 PART NUMBER: 83V76A24 J7-e

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FOR THE MDM OF1 AND RPC 29

STIMULI.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11072 ABORT: 3/1R

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE

6)

7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		.,

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: MANIFOLD 5, OX ISOL VLV

PART NUMBER: 22V42LV258 J1-1 (BOTH DIODES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSS OF ONE DIODE HAS NO EFFECT. LOSS OF SECOND DIODE (THE REDUNDANCY) PREVENTS FURTHER OXIDIZER VALVE MOVEMENT. IF VALVE IS OPEN, INABILITY TO CLOSE VALVE PREVENTS ISOLATION OF THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: FRCS MDAC ID: 11073

ITEM: DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
  4) MANIFOLD 5, OX & FU ISOL VLVS
  5) DIODE

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	,		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MANIFOLD 5, OX ISOL VLV

PART NUMBER: 22V42LV258 J1-1 (BOTH DIODES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM ERRONEOUS STIMULI TO THE

OXIDIZER SOLENOIDS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11074 ABORT: 3/1R

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	: 3/1R		,

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: MANIFOLD 5, FU ISOL VLV

PART NUMBER: 22V42LV257 J1-1 (BOTH DIODES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSS OF ONE DIODE HAS NO EFFECT. LOSS OF SECOND DIODE (THE REDUNDANT) PREVENTS FURTHER FUEL VALVE MOVEMENT. IF VALVE IS OPEN, INABILITY TO CLOSE VALVE PREVENTS ISOLATION OF THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87 FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: FRCS 3/3 MDAC ID: 11075 ITEM: DIODE FAILURE MODE: FAILS SHORT LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST BREAKDOWN HIERARCHY: 1) ELECTRICAL COMPONENTS 2) CONTROLS 3) PROP STOR & DIST SUBSYSTEM 4) MANIFOLD 5, OX & FU ISOL VLVS 5) DIODE 6) 7) 8) 9) CRITICALITIES FLIGHT PHASE PRELAUNCH:

HDW/FUNC ABORT HDW/FUNC

3/3 RTLS: 3/3

3/3 TAL: 3/3

3/3 AOA: 3/3

3/3 ATO: 3/3 LIFTOFF: ONORBIT:

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MANIFOLD 5, FU ISOL VLV

PART NUMBER: 22V42LV257 J1-1 (BOTH DIODES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM ERRONEOUS STIMULI TO THE FUEL

SOLENOIDS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11076 ABORT: 3/1R

ITEM: CIRCUIT BREAKER

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) CIRCUIT BREAKER

6)

7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	3/1R		•

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: PANEL R15

PART NUMBER: 32V73A15 CB 73

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE CAPABILITY TO INHIBIT GROUND DRIVER MANUALLY. GPC COMMANDS STILL OPERABLE. LOSS OF THIS REDUNDANCY PREVENTS FURTHER VALVE MOVEMENT. IF VALVE IS CLOSED, VRCS IS NOT OPERABLE (LOSS OF MISSION). IF VALVE IS OPEN, INABILITY TO CLOSE VALVE PREVENTS ISOLATION OF THRUST LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

REFERENCES: ECN 102-8023A

REPORT DATE : 2/26/88 E-118

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3 MDAC ID: 11077 ABORT: 3/3

ITEM: CIRCUIT BREAKER FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) CIRCUIT BREAKER
- 6)
- 7)
- 8) 9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PANEL R15

PART NUMBER: 32V73A15 CB 73

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE CAPABILITY TO MANUALLY OPEN CIRCUIT BREAKER.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11078 ABORT: 3/2R

ITEM: MICROSWITCH

FAILURE MODE: FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) MICROSWITCH

6)

7)

8) 9)

# CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING	: 3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: MANIFOLD 5, OX & FU ISOL VLV

PART NUMBER: 22V42LV158 J1-3, 9; 22V42LV157 J1-3, 9

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO MONITOR ISOLATION VALVE OPEN OR CLOSE STATUS. MANIFOLD STATUS (MDM FF3) PROVIDES LATEST MICROSWITCH DISCRETE INFORMATION OF VALVE LOCATION. VRCS MAY BE LOST IF VALVES ARE THOUGHT TO BE CLOSED (LOSS OF MISSION). ALSO LOSE INHIBITS TO THE TYPE III "OPEN" AND "CLOSE" HYBRID DRIVERS.

REFERENCES: ECN 102-8023A

REPORT DATE : 2/26/88 E-120

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/2R ABORT: 3/2R SUBSYSTEM: FRCS ABORT: MDAC ID: 11079

ITEM: MICROSWITCH

FAILURE MODE: FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) MICROSWITCH
- 6)
- 7) 8)
- 9)

## CRITICALITIES

IDW/FUNC 3/3 3/3 3/2R 3/3 3/3	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 3/3 3/3 3/3 3/2R
	3/3 3/2R 3/3	3/3 RTLS: 3/3 TAL: 3/2R AOA: 3/3 ATO:

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: MANIFOLD 5, OX & FU ISOL VLV

PART NUMBER: 22V42LV158 J1-3, 9; 22V42LV157 J1-3, 9

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE CAPABILITY TO MONITOR OPEN OR CLOSE STATUS. VRCS MAY BE LOST IF VALVES ARE THOUGHT TO BE CLOSED (LOSS OF MISSION). ALSO LOSE INHIBITS TO THE TYPE III "OPEN" OR "CLOSE" HYBRID DRIVERS.

DATE: 10/01/87

HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11080 ABORT: 3/1R

ITEM: HE OX & FU ISOL VLV A OR B SWITCH FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) HE PRESS SUBSYSTEM
- 4) HE OX & FU ISOL A & B VLVS
- 5) HE OX & FU ISOL VLV A OR B SWITCH 16 OR 17

6)

7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/1R	RTLS:	3/1R	
LIFTOFF:	3/1R	TAL:	3/1R	
ONORBIT:	3/1R	AOA:	3/1R	
DEORBIT:	3/1R	ATO:	3/1R	
LANDING/SAFING:	3/1R		-,	

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08

PART NUMBER: 33V73A8S16; S17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE ISOLATION VALVE. REDUNDANCY TO CLOSE VALVE AVAILABLE WITH GPC COMMANDS. LOSS OF THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY PREVENTS ISOLATION OF THE HELIUM SYSTEM LEADING TO POSSIBLE OVERPRESSURIZATION AND RUPTURE OF PROPELLANT TANKS AND LINES.

10/01/87 DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS

FLIGHT: 2/1R

MDAC ID: 11081

ABORT:

2/1R

ITEM: HE OX & FU ISOL VLV A OR B SWITCH

FAILURE MODE: SWITCH SHORTS ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- CONTROLS 2)
- 3) HE PRESS SUBSYSTEM
- 4) HE OX & FU ISOL A & B VLVS
- 5) HE OX & FU ISOL VLV A OR B SWITCH 16 OR 17

6)

7)

8) 9)

CRITICALITIES

PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT:	DW/FUNC	ABORT	HDW/FUNC
	2/1R	RTLS:	2/1R
	2/1R	TAL:	2/1R
	2/1R	AOA:	2/1R
	2/1R	ATO:	2/1R
TANDING/SAFING:	2/1R		

LANDING/SAFING: 2/1R

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08

PART NUMBER: 33V73A8S16; S17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

WITH THE VALVE CLOSED, SHORT ACROSS CLOSE CONTACTS 5, 6 WILL PREVENT FURTHER VALVE MOVEMENT. THIS, COUPLED WITH THE LOSS OF HARDWARE REDUNDANCY PREVENTS CAPABILITY TO EXPEL PROPELLANTS WHICH LEADS TO C.G. SAFETY BOUNDARY EXCEEDANCE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

FLIGHT: 2/1R

SUBSYSTEM: FRCS

MDAC ID: 11082

ABORT: 2/1R

ITEM:

HE OX & FU ISOL VLV A OR B SWITCH FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) HE PRESS SUBSYSTEM
- 4) HE OX & FU ISOL A & B VLVS
- HE OX & FU ISOL VLV A OR B SWITCH 16 OR 17

6)

7)

8)

9)

# CRITICALITIES

	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	2/1R	RTLS:	2/1R
LIFTOFF:	2/1R	TAL:	2/1R
ONORBIT:	2/1R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	2/1R		-,:

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PNL 08

PART NUMBER: 33V73A8S16; S17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

WITH THE VALVE CLOSED, SHORT ACROSS CLOSE CONTACTS WILL PREVENT ANY FURTHER MOVEMENT OF THAT VALVE. THIS, COUPLED WITH THE LOSS OF HARDWARE REDUNDANCY PREVENTS CAPABILITY TO EXPEL PROPELLANTS WHICH LEADS TO C.G. SAFETY BOUNDARY EXCEEDANCE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3 MDAC ID: 11083 ABORT: 3/3

ITEM: HE OX & FU ISOL VLV A OR B SWITCH

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) HE PRESS SUBSYSTEM
- 4) HE OX & FU ISOL A & B VLVS
- 5) HE OX & FU ISOL VLV A OR B SWITCH 16 OR 17
- 6) 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		·

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 08

PART NUMBER: 33V73A8S16; S17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11084 ABORT: 3/1R

ITEM: HE OX & FU ISOL VLV A OR B SWITCH

FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) HE PRESS SUBSYSTEM
- 4) HE OX & FU ISOL A & B VLVS
- 5) HE OX & FU ISOL VLV A OR B SWITCH 16 OR 17

6) 7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08

PART NUMBER: 33V73A8S16; S17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

SHORT TO CASE WILL BLOW 1 AMP FUSE AND WILL PREVENT FURTHER SWITCH MOVEMENT. REDUNDANCY PROVIDED WITH THE GPC COMMANDS. LOSS OF THIS, COUPLED WITH THE LOSS OF HARDWARE REDUNDANCY PREVENTS CAPABILITY TO EXPEL PROPELLANTS IN EFFORTS TO MEET C.G. CONSTRAINTS.

10/01/87 DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS MDAC ID: 11085 FLIGHT: 3/1R ABORT: 3/1R

ITEM: OX & FU TK ISOL VLV 1/2 SWITCH FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) OX & FU TK ISOL VLV 1/2
- 5) OX & FU TK ISOL VLV 1/2 SWITCH 23

6)

7) 8)

9)

#### CRITICALITIES

	CKITICA	TITITIO	
FLIGHT PHASE  PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	HDW/FUNC 3/1R 3/1R 3/1R 3/1R	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 3/1R 3/1R 3/1R 3/1R
TRUDING OUT THE	•/ ==-		

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: PNL 08 S23 PART NUMBER: 33V73A8S23

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY CONTROL THE VALVES WITH THE SWITCH. REDUNDANCY IS PROVIDED BY THE MDM COMMANDS. LOSS OF THIS REDUNDANCY PREVENTS CLOSING/OPENING THE ISOLATION VALVE. FAILURE TO CLOSE THE ISOLATION VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. FAILURE TO OPEN THE ISOLATION VALVE COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY PREVENTS FORWARD RCS ACTIVITY WHICH LEADS TO INABILITY TO EXPEL PROPELLANTS TO MEET C.G. SAFETY BOUNDARIES.

DATE: 10/01/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS

FLIGHT: 3/1R

MDAC ID:

11086

ABORT:

3/1R

ITEM:

OX & FU TK ISOL VLV 1/2 SWITCH

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) OX & FU TK ISOL VLV 1/2
- OX & FU TK ISOL VLV 1/2 SWITCH 23

6)

7)

8)

9)

#### CRITICALITIES

	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		J/ 110

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: PNL 08 S23

PART NUMBER: 33V73A8S23

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY CONTROL THE VALVES WITH THE SWITCH. REDUNDANCY IS PROVIDED BY THE MDM COMMANDS. LOSS OF THIS REDUNDANCY PREVENTS CLOSING/OPENING THE ISOLATION VALVE. FAILURE TO CLOSE THE ISOLATION VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. FAILURE TO OPEN THE ISOLATION VALVE COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY PREVENTS FORWARD RCS ACTIVITY WHICH LEADS TO INABILITY TO EXPEL PROPELLANTS TO MEET C.G. SAFETY BOUNDARIES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11087 ABORT: 3/1R

ITEM: OX & FU TK ISOL VLV 1/2 SWITCH

FAILURE MODE: SWITCH SHORTS ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) OX & FU TK ISOL VLV 1/2
- 5) OX & FU TK ISOL VLV 1/2 SWITCH 23
- 6)
- 7) 8)
- 9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		•

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: PNL 08 S23 PART NUMBER: 33V73A8S23

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

WHILE IN THE GPC POSITION, A SHORT ACROSS OPEN CONTACTS 1, 2 WILL OPEN THE VALVE. THIS FAILURE, WITH THE LOSS OF ALL REDUNDANCY, COULD PREVENT ISOLATION OF A THRUSTER LEAK WHICH LEADS TO LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R ABORT: 3/1R MDAC ID: 11088

ITEM: OX & FU TK ISOL VLV 1/2 SWITCH

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) OX & FU TK ISOL VLV 1/2
- 5) OX & FU TK ISOL VLV 1/2 SWITCH 23

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S23 PART NUMBER: 33V73A8S23

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

IF THE VALVE IS CLOSED IN ORDER TO ISOLATE A LEAK, INADVERTENTLY OPENING THE VALVE PREVENTS ISOLATION OF THIS LEAK WHICH LEADS TO LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11089 ABORT: 3/1R

ITEM: OX & FU TK ISOL VLV 1/2 SWITCH FAILURE MODE: SHORT TO CASE OR POLE TO POLE

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) OX & FU TK ISOL VLV 1/2
- 5) OX & FU TK ISOL VLV 1/2 SWITCH 23

6) 7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S23 PART NUMBER: 33V73A8S23

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

SHORT TO CASE WILL BLOW THE 1 AMP FUSE. LOSE CAPABILITY TO MANUALLY CONTROL THE VALVES WITH THE SWITCH. REDUNDANCY IS PROVIDE BY THE MDM COMMANDS. LOSS OF THIS REDUNDANCY PREVENTS CLOSING/OPENING THE ISOLATION VALVE. FAILURE TO CLOSE THE ISOLATION VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. FAILURE TO OPEN THE ISOLATION VALVE COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY PREVENTS FORWARD RCS ACTIVITY WHICH LEADS TO INABILITY TO EXPEL PROPELLANTS TO MEET C.G. BOUNDARIES.

DATE:

10/01/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS

FLIGHT: 3/1R

MDAC ID:

11090

ABORT:

3/1R

ITEM:

OX & FU TK ISOL VLV 3/4/5 SWITCH 24

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) OX & FU TK ISOL VLV 3/4/5
- 5) OX & FU TK ISOL VLV 3/4/5 SWITCH 24

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S24

PART NUMBER: 33V73A8S24

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY CONTROL THE VALVES WITH THE SWITCH. REDUNDANCY IS PROVIDED BY THE MDM COMMANDS. LOSS OF THIS REDUNDANCY PREVENTS CLOSING (OPENING) THE ISOLATION VALVE. FAILURE TO CLOSE THE ISOLATION VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. FAILURE TO OPEN ISOLATION VALVE COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY PREVENTS FORWARD RCS ACTIVITY WHICH LEAD TO INABILITY TO EXPEL PROPELLANTS TO MEET C.G. BOUNDARIES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11091 ABORT: 3/1R

ITEM: OX & FU TK ISOL VLV 3/4/5 SWITCH 24

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) OX & FU TK ISOL VLV 3/4/5
- 5) OX & FU TK ISOL VLV 3/4/5 SWITCH 24

6) 7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S24
PART NUMBER: 33V73A8S24

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY CONTROL THE VALVES WITH THE SWITCH. REDUNDANCY IS PROVIDED BY THE MDM COMMANDS. LOSS OF THIS REDUNDANCY PREVENTS OPENING (CLOSING) THE ISOLATION VALVE. FAILURE TO CLOSE THE ISOLATION VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. FAILURE TO OPEN THE ISOLATION VALVE COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY PREVENTS FORWARD RCS ACTIVITY WHICH LEADS TO INABILITY TO EXPEL PROPELLANTS TO MEET C.G. SAFETY BOUNDARIES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11092 ABORT: 3/1R

ITEM: OX & FU TK ISOL VLV 3/4/5 SWITCH 24

FAILURE MODE: SWITCH SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) OX & FU TK ISOL VLV 3/4/5
- 5) OX & FU TK ISOL VLV 3/4/5 SWITCH 24

6)

7)

8)

9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	: 3/1R		-,

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S24 PART NUMBER: 33V73A8S24

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

WHILE IN THE GPC POSITION, A SHORT ACROSS OPEN CONTACTS 1, 2 WILL OPEN THE VALVE. THIS FAILURE, COUPLED WITH THE LOSS OF ALL REDUNDANCY, COULD PREVENT ISOLATION OF A THRUSTER LEAK WHICH LEADS TO LOSS OF CREW/VEHICLE.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R SUBSYSTEM: FRCS 3/1R ABORT: MDAC ID: 11093

OX & FU TK ISOL VLV 3/4/5 SWITCH 24 ITEM:

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) OX & FU TK ISOL VLV 3/4/5 5) OX & FU TK ISOL VLV 3/4/5 SWITCH 24

6) 7)

8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:			·

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S24 PART NUMBER: 33V73A8S24

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

IF THE VALVE WAS CLOSED IN ORDER TO ISOLATE A LEAK, INADVERTENTLY OPENING THE VALVE PREVENTS ISOLATION OF THIS LEAK WHICH LEADS TO LOSS OF CREW/VEHICLE.

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11094 ABORT: 3/1R

ITEM: OX & FU TK ISOL VLV 3/4/5 SWITCH 24

FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) OX & FU TK ISOL VLV 3/4/5
- 5) OX & FU TK ISOL VLV 3/4/5 SWITCH 24

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	: 3/1R		,

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S24 PART NUMBER: 33V73A8S24

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY CONTROL THE VALVES WITH THE SWITCH. REDUNDANCY IS PROVIDED BY THE MDM COMMANDS. LOSS OF THIS REDUNDANCY PREVENTS CLOSING (OPENING) THE ISOLATION VALVE. FAILURE TO CLOSE THE ISOLATION VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. FAILURE TO OPEN THE ISOLATION VALVE COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY PREVENTS FORWARD RCS ACTIVITY WHICH LEADS TO INABILITY TO EXPEL PROPELLANTS TO MEET C.G. SAFETY MARGINS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11095 ABORT: 3/1R

ITEM: MANIFOLD 1, OX & FU ISOL VLV SWITCH 30

FAILURE MODE: FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1, OX & FU ISOL VLVS
- 5) MANIFOLD 1, OX & FU ISOL VLV SWITCH 30

6) 7)

8) 9)

# CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S30 PART NUMBER: 33V73A8S30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY OPEN (CLOSE) THE VALVE. GPC COMMANDS PROVIDE REDUNDANCY TO OPEN (CLOSE) THE VALVE. LOSS OF ALL REDUNDANCY TO OPEN THE VALVE MAY CAUSE INABILITY TO EXPEL PROPELLANTS TO MEET C.G. CONSTRAINTS. INABILITY TO CLOSE VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. BOTH WARRANT LOSS OF CREW/VEHICLE.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 2/1R SUBSYSTEM: FRCS 2/1R ABORT: MDAC ID: 11096

MANIFOLD 1, OX & FU ISOL VLV SWITCH 30 ITEM:

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1, OX & FU ISOL VLVS
- 5) MANIFOLD 1, OX & FU ISOL VLV SWITCH 30

6) 7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S30 PART NUMBER: 33V73A8S30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

IF SWITCH SHORTS ACROSS CLOSE CONTACTS, CAPABILITY TO OPEN THE VALVE IS LOST. INABILITY TO OPEN THE VALVE COUPLED WITH THE LOSS OF HARDWARE REDUNDANCY MAY CAUSE LOSS OF JETS REQUIRED TO EXPEL PROPELLANTS TO MEET C.G. BOUNDARIES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

DATE: 10/01/87 HIGHEST CRITICAL 2/1R SUBSYSTEM: FRCS ABORT: 2/1R MDAC ID: 11097

ITEM: MANIFOLD 1, OX & FU ISOL VLV SWITCH 30

FAILURE MODE: SWITCH SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1, OX & FU ISOL VLVS
- 5) MANIFOLD 1, OX & FU ISOL VLV SWITCH 30
- 6)
- 7) 8)
- 9)

#### CRITICALITIES

	CKTITCM	TITITIO	
FLIGHT PHASE  PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	HDW/FUNC 3/3 3/1R 3/2R 2/1R	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 2/1R 2/1R 2/1R 3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S30 PART NUMBER: 33V73A8S30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:
IF SWITCH SHORTS ACROSS CONTACT SET 5, 6 (CLOSE), CAPABILITY TO OPEN THE VALVE IS LOST. INABILITY TO OPEN THE VALVE COUPLED WITH THE LOSS OF HARDWARE REDUNDANCY MAY CAUSE LOSS OF JETS REQUIRED TO EXPEL PROPELLANTS TO MEET C.G. BOUNDARIES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS

FLIGHT: 3/1R

MDAC ID: 11098

ABORT:

3/3

ITEM:

MANIFOLD 1, OX & FU ISOL VLV SWITCH 30

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1, OX & FU ISOL VLVS
- MANIFOLD 1, OX & FU ISOL VLV SWITCH 30 5)

6)

7)

8) 9)

CRITICALITIES

55 5 6665		··-	
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R 2/1R
ONORBIT:	3/3	AOA:	•
DEORBIT:	3/3		3/3
LANDING/SAFING:		ATO:	3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S30 PART NUMBER: 33V73A8S30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

IF SWITCH INADVERTENTLY CLOSES, THE JETS ON THE MANIFOLD WILL BE LOST. REDUNDANCY PROVIDED BY JETS ON MANIFOLD 3. LOSS OF ALL REDUNDANCY CAUSE LOSS OF JETS REQUIRED FOR ET SEPARATION.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R SUBSYSTEM: FRCS 2/1R ABORT: MDAC ID: 11099

MANIFOLD 1, OX & FU ISOL VLV SWITCH 30 ITEM:

FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1, OX & FU ISOL VLVS
- 5) MANIFOLD 1, OX & FU ISOL VLV SWITCH 30

6)

7) 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:			

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S30 PART NUMBER: 33V73A8S30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

IF SWITCH SHORTS TO CASE, THE 1A FUSE WILL BLOW CAUSING THE INABILITY TO OPEN/CLOSE THE VALVE MANUALLY. GPC COMMANDING OF THE VALVE STILL AVAILABLE. LOSS OF THIS COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY PREVENTS ISOLATION OF A THRUSTER LEAK.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11100 ABORT: 3/1R

ITEM: MANIFOLD 2, OX & FU ISOL VLV SWITCH 31

FAILURE MODE: SWITCH FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 2, OX & FU ISOL VLVS
- 5) MANIFOLD 2, OX & FU ISOL VLV SWITCH 31

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/10		-/

LANDING/SAFING: 3/1R

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S31 PART NUMBER: 33V73A8S31

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY OPEN (CLOSE) THE VALVE. GPC COMMANDS PROVIDE REDUNDANCY TO OPEN (CLOSE) THE VALVE. LOSS OF ALL REDUNDANCY TO OPEN THE VALVE MAY CAUSE INABILITY TO EXPEL PROPELLANT TO MEET C.G. CONSTRAINTS. INABILITY TO CLOSE VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. BOTH WARRANT LOSS OF CREW/VEHICLE.

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

FLIGHT: 2/1R ABORT: 2/1R SUBSYSTEM: FRCS MDAC ID: 11101

MANIFOLD 2, OX & FU ISOL VLV SWITCH 31 ITEM:

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 2, OX & FU ISOL VLVS
- 5) MANIFOLD 2, OX & FU ISOL VLV SWITCH 31

6) 7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	3/2R
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S31 PART NUMBER: 33V73A8S31

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

IF SWITCH SHORTS ACROSS CLOSE CONTACTS, CAPABILITY TO OPEN THE VALVE IS LOST. INABILITY TO OPEN THE VALVE COUPLED WITH THE LOSS OF HARDWARE REDUNDANCY MAY CAUSE LOSS OF JETS REQUIRED TO EXPEL BOUNDARIES TO MEET C.G. BOUNDARIES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/1R MDAC ID: 11102 ABORT: 2/1R

ITEM: MANIFOLD 2, OX & FU ISOL VLV SWITCH 31

FAILURE MODE: SWITCH SHORTS ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 2, OX & FU ISOL VLVS
- 5) MANIFOLD 2, OX & FU ISOL VLV SWITCH 31

6)

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8)

9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING.	3/3		_,

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S31 PART NUMBER: 33V73A8S31

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

IF SWITCH SHORTS ACROSS CONTACT SET 5, 6 (CLOSE), CAPABILITY TO OPEN THE VALVE IS LOST. INABIBLITY TO OPEN THE VALVE COUPLED WITH THE LOSS OF HARDWARE REDUNDANCY MAY CAUSE LOSS OF JETS REQUIRED TO EXPEL PROPELLANTS TO MEET C.G. BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12, CE, DE

REPORT DATE : 2/26/88 E-144

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R ABORT: 3/1R SUBSYSTEM: FRCS MDAC ID: 11103

MANIFOLD 2, OX & FU ISOL VLV SWITCH 31 ITEM:

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 2, OX & FU ISOL VLVS 5) MANIFOLD 2, OX & FU ISOL VLV SWITCH 31

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	3/1R	
LIFTOFF:	3/1R	TAL:	3/1R	
ONORBIT:	3/3	AOA:	3/3	
DEORBIT:	3/3	ATO:	3/3	
LANDING/SAFING:	3/3			

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S31 PART NUMBER: 33V73A8S31

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

IF VALVE INADVERTENTLY CLOSES, THE JETS ON THAT MANIFOLD WILL BE LOST. REDUNDANCY PROVIDED BY JETS ON MANIFOLD 4. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11104 ABORT: 2/1R

ITEM: MANIFOLD 2, OX & FU ISOL VLV SWITCH 31 FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- MANIFOLD 2, OX & FU ISOL VLVS
- 5) MANIFOLD 2, OX & FU ISOL VLV SWITCH 31

6)

7) 8)

9)

#### CRITICALITIES

	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		-/

DING/SAFING: 3/IR

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S31 PART NUMBER: 33V73A8S31

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

IF SWITCH SHORTS TO CASE, THE 1 AMP FUSE WILL BLOW CAUSING THE INABILITY TO OPEN/CLOSE THE VALVE MANUALLY. GPC COMMANDING OF THE VALVE STILL AVAILABLE. LOSS OF THIS REDUNDANCY COUPLED WITH THE LOSS OF ALL HARDWARE PREVENTS ISOLATION OF A THRUSTER LEAK.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11105 ABORT: 3/1R

ITEM: MANIFOLD 3, OX & FU ISOL VLV SWITCH 32

FAILURE MODE: SWITCH FAIL OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 3, OX & FU ISOL VLVS
- 5) MANIFOLD 3, OX & FU ISOL VLV SWITCH 32

6) 7)

8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	: 3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S32 PART NUMBER: 33V73A8S32

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY OPEN (CLOSE) THE VALVE GPC COMMANDS PROVIDE REDUNDANCY TO OPEN (CLOSE) THE VALVE. LOSS OF ALL REDUNDANCY TO OPEN THE VALVE MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANT TO MEET C.G. CONSTRAINTS. INABILITY TO CLOSE VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. BOTH WARRANT LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/1R MDAC ID: 11106 ABORT: 2/1R

MANIFOLD 3, OX & FU ISOL VLV SWITCH 32 ITEM:

FAILURE MODE: SWITCH FAIL SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 3, OX & FU ISOL VLVS
- 5) MANIFOLD 3, OX & FU ISOL VLV SWITCH 32

6)

7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	2/1R	
LIFTOFF:	3/1R	TAL:	2/1R	
ONORBIT:	3/2R	AOA:	2/1R	
DEORBIT:	2/1R	ATO:	2/1R	
LANDING/SAFING:	3/3		•	

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S32 PART NUMBER: 33V73A8S32

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

IF SWITCH SHORTS ACROSS CLOSE CONTACTS, CAPABILITY TO OPEN THE VALVE IS LOST. INABILITY TO OPEN THE VALVE COUPLED WITH THE LOSS OF HARDWARE REDUNDANCY MAY CAUSE LOSS OF JETS REQUIRED TO EXPEL PROPELLANTS TO MEET C.G. BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12, CE, DE

REPORT DATE: 2/26/88 E-148

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/1R MDAC ID: 11107 ABORT: 2/1R

ITEM: MANIFOLD 3, OX & FU ISOL VLV SWITCH 32

FAILURE MODE: SWITCH SHORTS ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 3, OX & FU ISOL VLVS
- 5) MANIFOLD 3, OX & FU ISOL VLV SWITCH 32

6)

7)

8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING	3/3		•

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S32 PART NUMBER: 33V73A8S32

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

IF SWITCH SHORTS ACROSS CONTACT SET 5, 6 (CLOSE), CAPABILITY TO OPEN THE VALVE IS LOST. INABILITY TO OPEN THE VALVE COUPLED WITH THE LOSS OF HARDWARE REDUNDANCY MAY CAUSE LOSS OF JETS REQUIRED TO EXPEL PROPELLANTS TO MEET C.G. BOUNDARIES.

REFERENCES: VS70-943099 REV B EO B12, CE, DE

REPORT DATE: 2/26/88

E-149

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11108 ABORT: 3/1R

ITEM: MANIFOLD 3, OX & FU ISOL VLV SWITCH 32

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 3, OX & FU ISOL VLVS
- 5) MANIFOLD 3, OX & FU ISOL VLV SWITCH 32
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	3/1R	
LIFTOFF:	3/1R	TAL:	3/1R	
ONORBIT:	3/3	AOA:	3/3	
DEORBIT:	3/3	ATO:	3/3	
LANDING/SAFING	: 3/3			

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S32 PART NUMBER: 33V73A8S32

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

IF SWITCH INADVERTENTLY CLOSES JETS ON THIS MANIFOLD WILL BE LOST. REDUNDANCY PROVIDED BY JETS ON MANIFOLD 1. LOSS OF THIS, COUPLED WITH THE LOSS OF HARDWARE REDUNDANCY MAY PREVENT CONTROL OF ET SEPARATION.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R SUBSYSTEM: FRCS ABORT: 2/1R MDAC ID: 11109

MANIFOLD 3, OX & FU ISOL VLV SWITCH 32 ITEM: FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 3, OX & FU ISOL VLVS
- 5) MANIFOLD 3, OX & FU ISOL VLV SWITCH 32

6) 7)

8) 9)

CRITICALITIES

<del></del>	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S32 PART NUMBER: 33V73A8S32

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

IF SWITCH SHORTS TO CASE, THE 1 AMP FUSE WILL BLOW CAUSING THE INABILITY TO OPEN/CLOSE THE VALVE MANUALLY. GPC COMMANDING OF THE VALVE STILL AVAILABLE. LOSS OF THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY PREVENTS ISOLATION OF A THRUSTER LEAK.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11110 ABORT: 3/1R

ITEM: MANIFOLD 4, OX & FU ISOL VLV SWITCH 33

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, OX & FU ISOL VLVS
- 5) MANIFOLD 4, OX & FU ISOL VLV SWITCH 33

6) 7)

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## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		-/

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S33 PART NUMBER: 33V73A8S33

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY OPEN (CLOSE) THE VALVE. GPC COMMANDS PROVIDE REDUNDANCY TO OPEN (CLOSE) THE VALVE. LOSS OF ALL REDUNDANCY TO OPEN THE VALVE MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANT TO MEET C.G. CONSTRAINTS. INABILITY TO CLOSE VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. BOTH WARRANT LOSS OF CREW/VEHICLE.

REFERENCES: VS70-943099 REV B EO B12, CE, DE

REPORT DATE : 2/26/88 E-152

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 2/1R SUBSYSTEM: FRCS ABORT: 2/1R MDAC ID: 11111

MANIFOLD 4, OX & FU ISOL VLV SWITCH 33 ITEM:

FAILURE MODE: SWTICH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- CONTROLS 2)
- PROP STOR & DIST SUBSYSTEM 3)
- 4) MANIFOLD 4, OX & FU ISOL VLVS
- 5) MANIFOLD 4, OX & FU ISOL VLV SWITCH 33

6) 7)

8) 9)

#### CRITICALITIES

	HDW/FUNC	ABORT	HDW/FUNC 2/1R
PRELAUNCH:	3/3	RTLS:	•
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S33 PART NUMBER: 33V73A8S33

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

IF SWITCH SHORTS ACROSS CLOSE CONTACTS, CAPABILITY TO OPEN THE VALVE IS LOST. INABILITY TO OPEN THE VALVE COUPLED WITH THE LOSS OF HARDWARE REDUNDANCY MAY CAUSE LOSS OF JETS REQUIRED TO EXPEL PROPELLANTS TO MEET C.G. BOUNDARIES.

DATE:

10/01/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS MDAC ID:

11112

FLIGHT: 2/1R ABORT:

2/1R

ITEM:

MANIFOLD 4, OX & FU ISOL VLV SWITCH 33 FAILURE MODE: SWITCH SHORTS ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, OX & FU ISOL VLVS
- 5) MANIFOLD 4, OX & FU ISOL VLV SWITCH 33

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8) 9)

CRITICALITIES

PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT:	HDW/FUNC 3/3 3/1R 3/2R 2/1R	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 2/1R 2/1R 2/1R 2/1R
LANDING/SAFING:		ATO:	2/1R

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PNL 08 S33

PART NUMBER: 33V73A8S33

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

IF SWITCH SHEETS ACROSS CONTACT SET 5, 6 (CLOSE), CAPABILITY TO OPEN THE VALVE IS LOST. INABILITY TO OPEN THE VALVE COUPLED WITH THE LOSS OF HARDWARE REDUNDANCY MAY CAUSE LOSS OF JETS REQUIRED TO EXPEL PROPELLANTS TO MEET C.G. BOUNDARIES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11113 ABORT: 3/1R

ITEM: MANIFOLD 4, OX & FU ISOL VLV SWITCH 33

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, OX & FU ISOL VLVS
- 5) MANIFOLD 4, OX & FU ISOL VLV SWITCH 33

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#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S33
PART NUMBER: 33V73A8S33

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

IF VALVE INADVERTENTLY CLOSES LOSE JETS ON THIS MANIFOLD. REDUNDANCY PROVIDED BY JETS ON MANIFOLD 2. LOSS OF THIS, COUPLED WITH THE LOSS OF HARDWARE REDUNDANCY MAY CAUSE LOSS OF JETS REQUIRED FOR ET SEPARATION.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R 11114 MDAC ID: ABORT: 2/1R

ITEM: MANIFOLD 4, OX & FU ISOL VLV SWITCH 33 FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, OX & FU ISOL VLVS
- 5) MANIFOLD 4, OX & FU ISOL VLV SWITCH 33

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#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	: 3/1R		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 08 S33 PART NUMBER: 33V73A8S33

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

IF SWITCH SHORTS TO CASE, THE 1 AMP FUSE WILL BLOW CAUSING THE INABILITY TO OPEN/CLOSE THE VALVE MANUALLY. GPC COMMANDING OF THE VALVE STILL AVAILABLE. LOSS OF THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY PREVENTS ISOLATION OF A THRUSTER LEAK.

10/01/87 DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/1R MDAC ID: 11115 ABORT: 2/1R

ITEM: RJDF1B F1 MANIFOLD LOGIC SWITCH 7 FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 1, RJDF 5) RJDF1B F1 MANIFOLD LOGIC SWITCH 7

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8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING	3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 014 S7 PART NUMBER: 33V73A14S7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO INHIBIT RPC 38. RPC 38 OUTPUT REQUIRED TO TURN ON DRIVER POWER, BITE DRIVER POWER, AND ELECTRONIC POWER. THIS CAUSES LOSS OF MANIFOLD 1 JETS. REDUNDANCY PROVIDED BY MANIFOLD 3 JETS WHICH FIRE IN THE SAME DIRECTION. LOSS OF ALL REDUNDANCY MAY AFFECT DE-ORBIT FRCS DUMP TO MEET C.G. BOUNDARIES.

HIGHEST CRITICALITY HDW/FUNC

DATE: 10/01/87 SUBSYSTEM: FRCS FLIGHT: 3/3 ABORT: 3/3 MDAC ID: 11116

RJDF1B F1 MANIFOLD LOGIC SWITCH 7 ITEM: FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 1, RJDF
- 5) RJDF1B F1 MANIFOLD LOGIC SWITCH 7

6) 7)

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#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 014 S7 PART NUMBER: 33V73A14S7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

THIS SWITCH FAILED SHORT CAUSES NO EFFECT. OTHER FAILURES

REQUIRED TO FIRE A THRUSTER INADVERTENTLY.

REFERENCES: VS70-942099 REV D EO DO1, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

REPORT DATE : 2/26/88 E-158

HIGHEST CRITICALITY HDW/FUNC

DATE: 10/01/87 SUBSYSTEM: FRCS FLIGHT: 3/3 ABORT: 3/3 MDAC ID: 11117

RJDF1B F1 MANIFOLD LOGIC SWITCH 7 ITEM:

FAILURE MODE: SWITCH FAILS SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 1, RJDF
- 5) RJDF1B F1 MANIFOLD LOGIC SWITCH 7

6) 7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 014 S7 PART NUMBER: 33V73A14S7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

THIS SWITCH FAILED SHORT CAUSES NO EFFECT. OTHER FAILURES

REQUIRED TO FIRE A THRUSTER INADVERTENTLY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: FRCS FLIGHT: 3/1R

MDAC ID: 11118 ABORT: 1/1

ITEM: RJDF1B F1 MANIFOLD LOGIC SWITCH 7

FAILURE MODE: SWITCH INADVERTENTLY OPENS (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 1, RJDF
- 5) RJDF1B F1 MANIFOLD LOGIC SWITCH 7

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8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		-, -

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 014 S7
PART NUMBER: 33V73A14S7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

IF SWITCH IS INADVERTENTLY SWITCHED OFF, JETS ON MANIFOLD 1 WILL NOT BE ABLE TO FIRE. DURING FLIGHT, SWITCH IS EASILY CORRECTABLE. DURING ASCENT, JETS ON OTHER MANIFOLDS PROVIDE REDUNDANCY. DURING RTLS/TAL, IF SWITCH IS INADVERTENTLY SWITCHED OFF, IT MAY CAUSE LOSS OF CREW/VEHICLE DUE TO INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

REFERENCES: VS70-942099 REV D EO DO1, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

REPORT DATE: 2/26/88 E-160

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

SUBSYSTEM: FRCS FLIGHT: 2/1R ABORT: 1/1 MDAC ID: 11119

ITEM: RJDF1B F1 MANIFOLD LOGIC SWITCH 7

FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 1, RJDF
- 5) RJDF1B F1 MANIFOLD LOGIC SWITCH 7

6) 7)

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#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 014 S7 PART NUMBER: 33V73A14S7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

IF SWITCH SHORTS TO CASE, THE 1 AMP FUSE WILL BLOW. THIS WILL CAUSE LOSS OF MANIFOLD 1 JETS. REDUNDANCY PROVIDED BY MANIFOLD 3 JETS WHICH FIRE IN THE SAME DIRECTION. LOSS OF ALL REDUNDANCY MAY AFFECT DE-ORBIT FRCS DUMP AND CAUSE LOSS OF JETS FOR ET SEPARATION. FAILURE DURING RTLS/TAL MAY CAUSE LOSS OF CREW/VEHICLE DUE TO INABILITY TO EXPEL ENOUGH PROPELLANTS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/1R MDAC ID: 11120 ABORT: 1/1

ITEM: RJDF1B F1 MANIFOLD DRIVER SWITCH 8

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 1, RJDF
- 5) RJDF1B F1 MANIFOLD DRIVER SWITCH 8

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING	: 3/3		

•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 014 S8 PART NUMBER: 33V73A14S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE CAPABILITY TO INHIBIT RELAY K11 AND HYBRID DRIVER, BOTH OF WHICH ARE REQUIRED TO PROVIDE JET DRIVER POWER. THIS CAUSES LOSS OF MANIFOLD 1 JETS AND A REDUNDANCY PATH FOR MANIFOLD 3 JETS. REDUNDANCY FOR MANIFOLD 1 JETS CAN STILL BE PROVIDED BY REMAINING REDUNDANT ELECTRICAL PATH FOR MANIFOLD 3 JETS. LOSS OF ALL REDUNDANCY PREVENTS FRCS DUMP REQUIRED TO MEET C.G. CONSTRAINTS. FAILURE DURING RTLS/TAL MAY CAUSE LOSS OF CREW/VEHICLE DUE TO INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

REFERENCES: VS70-942099 REV D EO DO1, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

REPORT DATE : 2/26/88 E-162

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3 MDAC ID: 11121 ABORT: 3/3

ITEM: RJDF1B F1 MANIFOLD DRIVER SWITCH 8 FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 1, RJDF
- 5) RJDF1B F1 MANIFOLD DRIVER SWITCH 8

6) 7)

8) 9)

#### CRITICALITIES

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FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	•		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 014 S8 PART NUMBER: 33V73A14S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH FAILED SHORT ALONE CAUSES NO EFFECT. REQUIRES OTHER FAILURES TO FIRE A THRUSTER INADVERTENTLY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3 MDAC ID: 11122 ABORT: 3/3

ITEM: RJDF1B F1 MANIFOLD DRIVER SWITCH 8

FAILURE MODE: SWITCH SHORTS ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 1, RJDF
- 5) RJDF1B F1 MANIFOLD DRIVER SWITCH 8

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 014 S8 PART NUMBER: 33V73A14S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH FAILED SHORT CAUSES NO EFFECT. OTHER FAILURES REQUIRED TO FIRE A THRUSTER INADVERTENTLY.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R ABORT: 1/1 SUBSYSTEM: FRCS MDAC ID: 11123

RJDF1B F1 MANIFOLD DRIVER SWITCH 8 ITEM:

FAILURE MODE: SWITCH INADVERTENTLY FAILS OPEN/CLOSED (WORST

CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 1, RJDF
- 5) RJDF1B F1 MANIFOLD DRIVER SWITCH 8

6)

7) 8)

9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 014 S8 PART NUMBER: 33V73A14S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

IF SWITCH IS INADVERTENTLY SWITCHED OFF, JETS ON MANIFOLD 1 WILL NOT BE ABLE TO FIRE. DURING FLIGHT, SWITCH IS EASILY CORRECTABLE. DURING ASCENT, JETS ARE USED FOR ET SEPARATION. REDUNDANCY PROVIDED BY OTHER MANIFOLDS. DURING RTLS/TAL, IT MAY CAUSE LOSS OF CREW/VEHICLE DUE TO INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

REFERENCES: VS70-942099 REV D EO DO1, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

E-165 REPORT DATE: 2/26/88

DATE: 10/01/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS

FLIGHT: 2/1R ABORT:

1/1

MDAC ID:

11124

RJDF1B F1 MANIFOLD DRIVER SWITCH 8

FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 1, RJDF
- 5) RJDF1B F1 MANIFOLD DRIVER SWITCH 8

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ITEM:

7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	3/3		- <b>/</b>

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

PNL 014 S8 LOCATION: PART NUMBER: 33V73A14S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

SHORT TO CASE, THE 2 AMP (OR 1 AMP) FUSE WILL BLOW. EITHER WILL CAUSE LOSS OF MANIFOLD 1 JETS. REDUNDANCY PROVIDED BY JETS ON MANIFOLD 3. JETS ARE REQUIRED FOR ET SEPARATION AND TO EXPEL PROPELLANTS TO MEET C.G. BOUNDARIES. FAILURE DURING RTLS/TAL MAY CAUSE LOSS OF CREW/VEHICLE DUE TO INABILITY TO EXPEL ENOUGH PROPELLANT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS

FLIGHT: 2/1R ABORT: 1/1

MDAC ID: 11125

ITEM:

RJDF1A F2 MANIFOLD LOGIC SWITCH 7

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- THRUSTER SUBSYSTEM 3)
- 4) MANIFOLD 2, RJDF
- 5) RJDF1A F2 MANIFOLD LOGIC SWITCH 7

61

7)

8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC PRELAUNCH: 3/3 LIFTOFF: 3/1R ONORBIT: 3/2R	3/3 3/1R	ABORT RTLS: TAL: AOA:	HDW/FUNC 1/1 1/1 2/1R
ONORBIT: DEORBIT: LANDING/SAFING:	2/1R	ATO:	2/1R 2/1R

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 015 S7 PART NUMBER: 33V73A15S7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE CAPABILITY TO TURN ON DRIVER POWER, BITE DRIVER POWER AND ELECTRONIC POWER. THIS CAUSES LOSS OF MANIFOLD 2 JETS. MANIFOLD 4 JETS PROVIDES -Y AND -Z THRUST REDUNDANCY AND MANIFOLD 1 OR 3 JETS PROVIDE + AND -X THRUST REDUNDANCY. LOSS OF ALL REDUNDANCY PREVENTS FRCS DUMP REQUIRED TO EXPEL PROPELLANTS TO MEET C.G. CONTRAINTS AND CAUSES LOSS OF JETS FOR ET SEPARATION. FAILURE DURING RTLS/TAL MAY CAUSE LOSS OF CREW/VEHICLE DUE TO INABILITY TO EXPEL ENOUGH PROPELLANTS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3 MDAC ID: 11126 3/3 ABORT:

ITEM: RJDF1A F2 MANIFOLD LOGIC SWITCH 7 FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 2, RJDF
- 5) RJDF1A F2 MANIFOLD LOGIC SWITCH 7

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8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	3/3		,

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 015 S7 PART NUMBER: 33V73A15S7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH FAILED SHORT ALONE CAUSES NO EFFECT. OTHER FAILURES REQUIRED TO FIRE A THRUSTER INADVERTENTLY.

DATE: 10/01/87 SUBSYSTEM: FRCS HIGHEST CRITICALITY HDW/FUNC

FLIGHT: 3/3 ABORT: 3/3 MDAC ID: 11127

ITEM: RJDF1A F2 MANIFOLD LOGIC SWITCH 7

FAILURE MODE: SWITCH FAILS SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 2, RJDF
- 5) RJDF1A F2 MANIFOLD LOGIC SWITCH 7

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8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 015 S7 PART NUMBER: 33V73A15S7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

SWITCH FAILED SHORT CAUSES NO EFFECT. OTHER FAILURES REQURIED TO FIRE A THURSTER INADVERTENTLY.

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

SUBSYSTEM: FRCS FLIGHT: 3/1R ABORT: 1/1 MDAC ID: 11128

RJDF1A F2 MANIFOLD LOGIC SWITCH 7 ITEM:

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 2, RJDF
- 5) RJDF1A F2 MANIFOLD LOGIC SWITCH 7

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 015 S7 PART NUMBER: 33V73A15S7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

IF SWITCH IS INADVERTENTLY SWITCHED OFF, JETS ON MANIFOLD 2 WILL NOT BE ABLE TO FIRE. DURING FLIGHT, SWITCH IS EASILY CORRECTABLE. DURING ASCENT, JETS ARE REQUIRED FOR ET SEPARATION. MANIFOLD 4 JETS PROVIDE REDUNDANCY. DURING RTLS/TAL IT MAY CAUSE LOSS OF CREW/VEHICLE DUE TO INABILITY TO EXPEL ENOUGH PROPELLANT TO MEET LANDING WEIGHT CONSTRAINTS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/1R MDAC ID: 11129 ABORT: 1/1

ITEM: RJDF1A F2 MANIFOLD LOGIC SWITCH 7

FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 2, RJDF
- 5) RJDF1A F2 MANIFOLD LOGIC SWITCH 7

6)

7) 8)

9)

#### CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/3	RTLS:	1/1
3/1R	TAL:	1/1
3/2R	AOA:	2/1R
2/1R	ATO:	2/1R
: 3/3		
	3/3 3/1R 3/2R 2/1R	3/3 RTLS: 3/1R TAL: 3/2R AOA: 2/1R ATO:

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 015 S7
PART NUMBER: 33V73A15S7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

IF SWITCH SHORTS TO CASE, THIS WILL BLOW THE 1 AMP FUSE. THIS WILL CAUSE LOSS OF MANIFOLD 2 JETS. REDUNDANCY PROVIDED BY JETS ON MANIFOLDS 1, 3, AND 4. LOSS OF ALL REDUNDANCY PREVENTS FRCS DUMP REQUIRED TO EXPEL PROPELLANTS TO MEET C.G. CONSTRAINTS AND CAUSE LOSS OF JETS FOR ET SEPARATION. FAILURE DURING RTLS/TAL MAY CAUSE LOSS OF CREW/VEHICLE DUE TO INABILITY TO EXPEL ENOUGH PROPELLANTS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/1R MDAC ID: 11130 ABORT: 1/1

ITEM: RJDF1A F2 MANIFOLD DRIVER SWITCH 8

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 2, RJDF

RJDF1A F2 MANIFOLD DRIVER SWITCH 8

6)

7) 8)

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#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 015 S8 PART NUMBER: 33V73A15S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO TURN ON DRIVER POWER. THIS CAUSES LOSS OF MANIFOLD 2 JETS. REDUNDANCY PROVIDED BY JETS ON MANIFOLD 1 , 3, AND 4. LOSS OF ALL REDUNDANCY PREVENTS FRCS DUMP REQUIRED TO EXPEL ENOUGH PROPELLANTS TO MEET C.G. CONSTRAINTS AND CAUSE LOSS OF JETS FOR ET SEPARATION. FAILURE DURING RTLS/TAL MAY CAUSE LOSS OF CREW/VEHICLE DUE TO INABILITY TO EXPEL ENOUGH PROPELLANTS.

REFERENCES: VS70-942099 REV D EO DO1, AJ; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

REPORT DATE: 2/26/88 E-172

HIGHEST CRITICALITY HDW/FUNC

DATE: 10/01/87 SUBSYSTEM: FRCS FLIGHT: 3/3 ABORT: 3/3 MDAC ID: 11131

RJDF1A F2 MANIFOLD DRIVER SWITCH 8 ITEM: FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

SUBSYS LEAD: C.D. PRUST LEAD ANALYST: D. HARTMAN

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 2, RJDF
- 5) RJDF1A F2 MANIFOLD DRIVER SWITCH 8

6)

7) 8)

9)

#### CRITICALITIES

	V-1		
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 015 S8 PART NUMBER: 33V73A15S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH FAILED SHORT CAUSES NO EFFECT. OTHER FAILURES REQUIRED TO FIRE A THRUSTER INADVERTENTLY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3 MDAC ID: 11132 ABORT: 3/3

ITEM: RJDF1A F2 MANIFOLD DRIVER SWITCH 8

FAILURE MODE: SWITCH FAILS SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 2, RJDF
- 5) RJDF1A F2 MANIFOLD DRIVER SWITCH 8

6) 7)

8) 9)

#### CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/3	RTLS:	3/3
3/3	TAL:	3/3
3/3	AOA:	3/3
3/3	ATO:	3/3
: 3/3		·
	3/3 3/3 3/3 3/3	3/3 RTLS: 3/3 TAL: 3/3 AOA: 3/3 ATO:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 015 S8
PART NUMBER: 33V73A15S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

SWITCH FAILED SHORT CAUSES NO EFFECT. OTHER FAILURES REQURIED TO FIRE A THRUSTER INADVERTENTLY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11133 ABORT: 1/1

ITEM: RJDF1A F2 MANIFOLD DRIVER SWITCH 8

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 2, RJDF
- 5) RJDF1A F2 MANIFOLD DRIVER SWITCH 8

6) 7)

8) 9)

CRITICALITIES

DETAIL DILLOR	HDW/FUNC	ABORT	HDW/FUNC
FLIGHT PHASE			•
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	: 3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 015 S8 PART NUMBER: 33V73A15S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

IF SWITCH IS INADVERTENTLY SWITCHED OFF, LOSE JETS ON MANIFOLD 2. SWITCH POSITION IS EASILY CORRECTABLE. DURING FLIGHT JETS ARE REQUIRED FOR ET SEPARATION. REDUNDANCY PROVIDED BY MANIFOLD 4. DURING RTLS/TAL, IT MAY CAUSE LOSS OF CREW/VEHICLE DUE TO INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

DATE:

10/01/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS MDAC ID:

11134

FLIGHT: 2/1R ABORT:

1/1

ITEM:

RJDF1A F2 MANIFOLD DRIVER SWITCH 8

FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 2, RJDF
- 5) RJDF1A F2 MANIFOLD DRIVER SWITCH 8

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 015 S8

PART NUMBER: 33V73A15S8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

IF SWITCH SHORTS TO CASE, 1 AMP FUSE WILL BLOW. THIS WILL CAUSE LOSS OF MANIFOLD 2 JETS. REDUNDANCY PROVIDED BY JETS ON MANIFOLD 1, 3, AND 4. LOSS OF ALL REDUNDANCY PREVENTS FRCS DUMP REQUIRED TO EXPEL PROPELLANTS TO MEET C.G. CONSTRAINTS AND CAUSE LOSS OF JETS FOR ET SEPARATION. FAILURE DURING RTLS/TAL MAY CAUSE LOSS OF CREW/VEHICLE DUE TO INABILITY TO EXPEL ENOUGH PROPELLANTS.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 2/1R SUBSYSTEM: FRCS ABORT: 1/1 11135 MDAC ID:

RJDF2A F3 MANIFOLD LOGIC SWITCH 5 ITEM: FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- CONTROLS 2)
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 3, RJDF
- 5) RJDF2A F3 MANIFOLD LOGIC SWITCH 5

6)

7) 8)

9)

## CRITICALITIES

	CRITICA	TITIES	
FLIGHT PHASE  PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	HDW/FUNC 3/3 3/1R 3/2R 2/1R 3/3	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 1/1 1/1 2/1R 2/1R

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 016 S5 PART NUMBER: 33V73A16S5

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE: LOSE CAPABILITY TO TURN ON DRIVER POWER, BITE DRIVER POWER, AND ELECTRONIC POWER. THIS CAUSES LOSS OF MANIFOLD 3 JETS. REDUNDANCY PROVIDED BY MANIFOLD 1 JETS. LOSS OF ALL REDUNDANCY PREVENTS FRCS DUMP TO EXPEL PROPELLANTS TO MEET C.G. CONSTRAINTS AND CAUSES LOSS OF -Z JETS FOR ET SEPARATION. FAILURE DURING RTLS/TAL MAY CAUSE LOSS OF CREW/VEHICLE DUE TO INABILITY TO EXPEL ENOUGH PROPELLANTS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: FRCS

MDAC ID: 11136 FLIGHT: 3/3
ABORT: 3/3

THEM: RJDF2A F3 MANIFOLD LOGIC SWITCH 5
FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 3, RJDF
- 5) RJDF2A F3 MANIFOLD LOGIC SWITCH 5

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE PRELAUNCH: LIFTOFF:	HDW/FUNC 3/3 3/3	ABORT RTLS: TAL:	HDW/FUNC
ONORBIT: DEORBIT: LANDING/SAFING:	3/3 3/3	AOA: ATO:	3/3 3/3 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 016 S5 PART NUMBER: 33V73A16S5

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

SWITCH FAILED SHORT CAUSES NO EFFECT. OTHER FAILURES REQUIRED TO FIRE A THRUSTER INADVERTENTLY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 11137 ABORT: 3/3

ITEM: RJDF2A F3 MANIFOLD LOGIC SWITCH 5

FAILURE MODE: SWITCH SHORTS ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 3, RJDF
- 5) RJDF2A F3 MANIFOLD LOGIC SWITCH 5

6) 7)

8)

9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 016 S5 PART NUMBER: 33V73A16S5

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH FAILED SHORT CAUSES NO EFFECT. OTHER FAILURES REQUIRED TO FIRE A THURSTER INADVERTENTLY.

REFERENCES: VS70-942099 REV D EO DO1, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

REPORT DATE: 2/26/88 E-179

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11138 ABORT: 1/1

ITEM: RJDF2A F3 MANIFOLD LOGIC SWITCH 5

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 3, RJDF
- 5) RJDF2A F3 MANIFOLD LOGIC SWITCH 5

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 016 S5 PART NUMBER: 33V73A16S5

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

IF SWITCH IS INADVERTENTLY SWITCHED OFF, JETS ON MANIFOLD 3 WILL NOT BE ABLE TO FIRE. DURING ASCENT, JETS ARE REQUIRED FOR ET SEPARATION. DURING FLIGHT, SWITCH IS EASILY CORRECTABLE. DURING RTLS/TAL MAY CAUSE LOSS OF CREW/VEHICLE DUE TO INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/1R MDAC ID: 11139 ABORT: 1/1

ITEM: RJDF2A F3 MANIFOLD DRIVER SWITCH 5
FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 3, RJDF
- 5) RJDF2A F3 MANIFOLD DRIVER SWITCH 5

6) 7)

8)

9)

### CRITICALITIES

	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	3/3		-,

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 016 S5 PART NUMBER: 33V73A16S5

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

IF SWITCH SHORTS TO CASE, THE 1 AMP FUSE WILL BLOW. THIS WILL CAUSE LOSS OF MANIFOLD 3 JETS. REDUNDANCY PROVIDED BY JETS ON MANIFOLD 1, 3, AND 4. LOSS OF ALL REDUNDANCY PREVENTS FRCS DUMP TO EXPEL PROPELLANTS TO MEET C.G. CONSTRAINTS AND CAUSES LOSS OF -Z JETS REQUIRED FOR ET SEPARATION. DURING RTLS/TAL, MAY CAUSE LOSS OF CREW/VEHICLE DUE TO INABILITY TO EXPEL ENOUGH PROPELLANTS.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 2/1R SUBSYSTEM: FRCS ABORT: 1/1 MDAC ID: 11140

RJDF2A F3 MANIFOLD DRIVER SWITCH 6 ITEM:

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 3, RJDF
- 5) RJDF2A F3 MANIFOLD DRIVER SWITCH 6

6)

7)

8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 016 S6 PART NUMBER: 33V73A16S6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO TURN ON DRIVER POWER, BITE DRIVER POWER, AND ELECTRONIC POWER. THIS CAUSES LOSS OF MANIFOLD 3 JETS. REDUNDANCY PROVIDED BY MANIFOLD 1 JETS. LOSS OF ALL REDUNDANCY PREVENTS FRCS DUMP TO EXPEL PROPELLANTS TO MEET C.G. CONSTRAINTS AND CAUSES LOSS OF -Z JETS FOR ET SEPARATION. FAILURE DURING RTLS/TAL MAY CAUSE LOSS OF CREW/VEHICLE DUE TO INABILITY TO EXPEL ENOUGH PROPELLANTS.

REFERENCES: VS70-942099 REV D EO DO1, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

E-182 REPORT DATE: 2/26/88

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 11141 ABORT: 3/3

ITEM: RJDF2A F3 MANIFOLD DRIVER SWITCH 6 FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 3, RJDF
- 5) RJDF2A F3 MANIFOLD DRIVER SWITCH 6

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#### CRITICALITIES

01/2 2 2 01:00 =			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 016 S6
PART NUMBER: 33V73A16S6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH FAILED SHORT CAUSES NO EFFECT. OTHER FAILURES REQUIRED TO FIRE A THRUSTER INADVERTENTLY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3 MDAC ID: 11142 ABORT: 3/3

ITEM: RJDF2A F3 MANIFOLD DRIVER SWITCH 6

FAILURE MODE: SWITCH FAILS SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 3, RJDF
- RJDF2A F3 MANIFOLD DRIVER SWITCH 6 5)

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#### CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/3	RTLS:	3/3
3/3	TAL:	3/3
3/3	AOA:	3/3
3/3	ATO:	3/3
3/3		,
	3/3 3/3 3/3 3/3	3/3 RTLS: 3/3 TAL: 3/3 AOA: 3/3 ATO:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 016 S6 PART NUMBER: 33V73A16S6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

SWITCH FAILED SHORT CAUSES NO EFFECT. OTHER FAILURE REQUIRED TO FIRE A THRUSTER INADVERTENTLY.

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

SUBSYSTEM: FRCS FLIGHT: 3/1R ABORT: 1/1 MDAC ID: 11143

RJDF2A F3 MANIFOLD DRIVER SWITCH 6 ITEM:

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 3, RJDF
- 5) RJDF2A F3 MANIFOLD DRIVER SWITCH 6

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#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 016 S6 PART NUMBER: 33V73A16S6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

IF SWITCH IS INADVERTENTLY SWITCHED OFF, JETS ON MANIFOLD 3 WILL NOT BE ABLE TO FIRE. DURING ASCENT, JETS ARE REQUIRED FOR ET SEPARATION. DURING FLIGHT, SWITCH IS EASILY CORRECTABLE. DURING RTLS/TAL MAY CAUSE LOSS OF CREW/VEHICLE DUE TO INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/1R MDAC ID: 11144 ABORT: 1/1

ITEM: RJDF2A F3 MANIFOLD DRIVER SWITCH 6
FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 3, RJDF
- 5) RJDF2A F3 MANIFOLD DRIVER SWITCH 6

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#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING	: 3/3		-

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 016 S6 PART NUMBER: 33V73A16S6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

IF SWITCH SHORTS TO CASE, THE 1 AMP FUSE WILL BLOW. THIS WILL CAUSE LOSS OF MANIFOLD 3 JETS. REDUNDANCY PROVIDED BY MANIFOLD 1 JETS. LOSS OF ALL REDUNDANCY PREVENTS FRCS DUMP TO EXPEL PROPELLANTS TO MEET C.G. CONSTRAINTS AND CAUSES LOSS OF -Z JETS REQUIRED FOR ET SEPARATION. DURING RTLS/TAL, MAY CAUSE LOSS OF CREW/VEHICLE DUE TO INABILITY TO EXPEL ENOUGH PROPELLANTS.

REFERENCES: VS70-942099 REV D EO DO1, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

REPORT DATE: 2/26/88 E-186

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/1R MDAC ID: 11145 ABORT: 2/1R

ITEM: RJDF2A F4/F5 MANIFOLD LOGIC SWITCH 12

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 4/5, RJDF
- 5) RJDF2A F4/F5 MANIFOLD LOGIC SWITCH 12

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### CRITICALITIES

DITCHM DUACE	UDW/PIINC	ABORT	HDW/FUNC
FLIGHT PHASE	HDW/FUNC		•
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	2/1R	ATO:	3/2R
LANDING/SAFING	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 016 S12 PART NUMBER: 33V73A16S12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO TURN ON DRIVER POWER, BITE DRIVER POWER, AND ELECTRONIC POWER FOR BOTH MANIFOLDS 4 AND 5 JETS. MANIFOLD 4 JET REDUNDANCY FOR -Y AND -Z THRUST PROVIDED BY MANIFOLD 2 JETS. NO REDUNDANCY PROVIDED FOR MANIFOLD 5 JETS. LOSS OF ALL REDUNDANT -Y AND -Z THRUST PREVENTS FRCS DUMP REQUIRED TO EXPEL ENOUGH PROPELLANTS TO MEET C.G. CONSTRAINTS AND CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION. LOSS OF MANIFOLD 5 JETS (VERNIERS) MAY CAUSE LOSS OF MISSION.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3 MDAC ID: 11146 ABORT: 3/3

ITEM: RJDF2A F4/F5 MANIFOLD LOGIC SWITCH 12

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 4/5, RJDF
- 5) RJDF2A F4/F5 MANIFOLD DRIVER SWITCH 12

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#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 016 S12 PART NUMBER: 33V73A16S12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH FAILED SHORT CAUSES NO EFFECT. OTHER FAILURES REQUIRED TO

FIRE A THRUSTER INADVERTENTLY.

REFERENCES: VS70-942099 REV D EO DO1, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

REPORT DATE : 2/26/88 E-188

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE: FLIGHT: 3/3

SUBSYSTEM: FRCS 3/3 ABORT: MDAC ID: 11147

RJDF2A F4/F5 MANIFOLD LOGIC SWITCH 12

ITEM: FAILURE MODE: SWITCH FAILS SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 4/5, RJDF
- 5) RJDF2A F4/F5 MANIFOLD DRIVER SWITCH 12

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8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	1/3
ONORBIT:	3/3	AOA:	3/3
	3/3	ATO:	3/3
DEORBIT:	-/		-,
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 016 S12 PART NUMBER: 33V73A16S12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH FAILED SHORT CAUSES NO EFFECT. OTHER FAILURES REQUIRED TO FIRE A THRUSTER INADVERTENTLY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11148 ABORT: 2/1R

ITEM: RJDF2A F4/F5 MANIFOLD LOGIC SWITCH 12

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 4/5, RJDF
- 5) RJDF2A F4/F5 MANIFOLD LOGIC SWITCH 5

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#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 016 S12 PART NUMBER: 33V73A16S12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

IF SWITCH IS INADVERTENTLY TURNED OFF, LOSE JETS ON MANIFOLD 4 AND 5. MANIFOLD 4 JETS USED DURING ASCENT (REDUNDANCY PROVIDED FOR ET SEPARATION BY JETS ON MANIFOLD 2). SWITCH IS EASILY CORRECTABLE ON-ORBIT (NO EFFECT). DURING RTLS/TAL, MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

REFERENCES: VS70-942099 REV D EO DO1, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

REPORT DATE: 2/26/88 E-190

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R SUBSYSTEM: FRCS 2/1R ABORT: MDAC ID: 11149

RJDF2A F4/F5 MANIFOLD LOGIC SWITCH 12 ITEM:

FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 4/5, RJDF 5) RJDF2A F4/F5 MANIFOLD LOGIC SWITCH 12

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8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 016 S12 PART NUMBER: 33V73A16S12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

SHORT TO CASE WILL BLOW 1 AMP FUSE. LOSE CAPABILITY TO TURN ON DRIVER POWER, BITE DRIVER POWER, AND ELECTRONIC POWER FOR BOTH MANIFOLDS 4 AND 5 JETS. MANIFOLD 4 JET REDUNDANCY FOR -Y AND -Z THRUST PROVIDED BY MANIFOLD 2 JETS. NO REDUNDANCY PROVIDED FOR MANIFOLD 5 JETS. LOSS OF ALL REDUNDANT -Y AND -Z THRUST PREVENTS FRCS DUMP REQUIRED TO EXPEL ENOUGH PROPELLANTS TO MEET C.G. CONSTRAINTS AND CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION. LOSS OF MANIFOLD 5 JETS (VERNIERS) MAY CAUSE LOSS OF MISSION.

DATE:

10/01/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS MDAC ID:

11150

FLIGHT: ABORT:

2/1R 1/1

ITEM:

RJDF2A F4/F5 MANIFOLD DRIVER SWITCH 13

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- MANIFOLD 4/5, RJDF 4)
- 5) RJDF2A F4/F5 MANIFOLD DRIVER SWITCH 13

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7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING:	: 3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 016 S13 PART NUMBER: 33V73A16S13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO TURN ON DRIVER POWER FOR MANIFOLD 4 JETS AND LOSE REDUNDANCY PATH FOR DRIVER POWER TO MANIFOLD 3 JETS. MANIFOLD 4 JET REDUNDANCY FOR -Y AND -Z THRUST PROVIDED BY MANIFOLD 2 JETS. LOSS OF ALL REDUNDANCY -Y AND -Z THRUST PREVENTS FRCS DUMP REQUIRED TO EXPEL ENOUGH PROPELLANTS TO MEET C.G. CONSTRAINTS AND CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION. FAILURE DURING RTLS/TAL MAY CAUSE LOSS OF CREW/VEHICLE DUE TO INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3 MDAC ID: 11151 ABORT: 3/3

ITEM: RJDF2A F4/F5 MANIFOLD DRIVER SWITCH 13

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 4/5, RJDF
- 5) RJDF2A F4/F5 MANIFOLD DRIVER SWITCH 13

6) 7)

8) 9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 016 S13 PART NUMBER: 33V73A16S13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

SWITCH FAILED SHORT CAUSES NO EFFECT. OTHER FAILURES REQUIRED TO FIRE A THRUSTER INADVERTENTLY.

REFERENCES: VS70-942099 REV D EO DO1, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

REPORT DATE : 2/26/88 E-193

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3 MDAC ID: 11152 ABORT: 3/3

ITEM: RJDF2A F4/F5 MANIFOLD DRIVER SWITCH 13

FAILURE MODE: SWITCH FAILS SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 4/5, RJDF
- 5) RJDF2A F4/F5 MANIFOLD DRIVER SWITCH 13

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#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 016 S13 PART NUMBER: 33V73A16S13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH FAILED SHORT CAUSES NO EFFECT. OTHER FAILURES REQUIRED TO

FIRE A THRUSTER INADVERTENTLY.

REFERENCES: VS70-942099 REV D EO DO1, AN; JSC 11174, SPACE

SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11153 ABORT: 1/1

ITEM: RJDF2A F4/F5 MANIFOLD DRIVER SWITCH 13

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 4/5, RJDF
- 5) RJDF2A F4/F5 MANIFOLD DRIVER SWITCH 13

6) 7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	: 3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 016 S13 PART NUMBER: 33V73A16S13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

IF SWITCH INADVERTENTLY TURNS OFF, LOSE JETS ON MANIFOLD 4 AND A REDUNDANCY PATH FOR DRIVER POWER TO MANIFOLD 3 JETS. MANIFOLD 4 JETS USED DURING ASCENT (REDUNDANCY PROVIDED FOR ET SEPARATION BY JETS ON MANIFOLD 2). SWITCH IS EASILY CORRECTABLE ON-ORBIT (NO EFFECT). FAILURE DURING RTLS/TAL MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANT TO MEET LANDING WEIGHT CONSTRAINTS.

REFERENCES: VS70-942099 REV D EO DO1, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

REPORT DATE: 2/26/88 E-195

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/1R MDAC ID: 11154 ABORT: 1/1

ITEM: RJDF2A F4/F5 MANIFOLD DRIVER SWITCH 13

FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 4/5, RJDF
- 5) RJDF2A F4/F5 MANIFOLD DRIVER SWITCH 13

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9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	2/1R
LANDING/SAFING	3: 3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 016 S13 PART NUMBER: 33V73A16S13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

IF SWITCH SHORTS TO CASE IT WILL BLOW THE 2 AMP FUSE. LOSE CAPABILITY TO TURN ON DRIVER POWER FOR MANIFOLD 4 JETS AND LOSE REDUNDANCY PATH FOR DRIVER POWER TO MANIFOLD 3 JETS. MANIFOLD 4 JET REDUNDANCY FOR -Y AND -Z THRUST PROVIDED BY MANIFOLD 2 JETS. LOSS OF ALL REDUNDANT -Y AND -Z THRUST PREVENTS FRCS DUMP REQUIRED TO EXPEL ENOUGH PROPELLANTS TO MEET C.G. CONSTRAINTS AND CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION. FAILURE DURING RTLS/TAL MAY CAUSE LOSS OF CREW/VEHICLE DUE TO INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

REFERENCES: VS70-942099 REV D EO DO1, AN; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

REPORT DATE: 2/26/88 E-196

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/2
MDAC ID: 11155 ABORT: 3/3

ITEM: RJDF2B L5/F5/R5 MANIFOLD DRIVER SWITCH 15

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 5, RJDF
- 5) RJDF2B L5/F5/R5 MANIFOLD DRIVER SWITCH 15

6) 7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 016 S15 PART NUMBER: 33V73A16S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

FAILURE WILL RESULT IN THE LOSS OF DRIVER POWER TO THE L5/F5/R5, RESULTING IN LOSS OF THE VERNIER RCS, AND MAY AFFECT ON-ORBIT OPERATIONS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3 MDAC ID: 11156 ABORT: 3/3

ITEM: RJDF2B L5/F5/R5 MANIFOLD DRIVER SWITCH 15

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 5, RJDF
- 5) RJDF2B L5/F5/R5 MANIFOLD DRIVER SWITCH 15

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8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		-, -

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 016 S15 PART NUMBER: 33V73A16S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

SWITCH FAILED SHORT HAS NO EFFECT. OTHER FAILURES REQUIRED TO FIRE A THRUSTER INADVERTENTLY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3 MDAC ID: 11157 ABORT: 3/3

ITEM: RJDF2B L5/F5/R5 MANIFOLD DRIVER SWITCH 15

FAILURE MODE: SWITCH FAILS SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 5, RJDF
- 5) RJDF2B L5/F5/R5 MANIFOLD DRIVER SWITCH 15

6) 7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	•		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 016 S15 PART NUMBER: 33V73A16S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH FAILED SHORT HAS NO EFFECT. OTHER FAILURES REQUIRED TO FIRE A THRUSTER INADVERTENTLY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3 MDAC ID: 11158 ABORT: 3/3

ITEM: RJDF2B L5/F5/R5 MANIFOLD DRIVER SWITCH 15

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 5, RJDF
- 5) RJDF2B L5/F5/R5 MANIFOLD DRIVER SWITCH 15

6) 7)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		·

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 016 S15 PART NUMBER: 33V73A16S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. SWITCH IS EASILY CORRECTABLE.

REFERENCES: VS70-942099 REV D EO DO1, AN; JSC 11174, SPACE

SHUTTLE SYSTEMS HANDBOOK, PAGE 11.10, RCS SIG 1

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/2 MDAC ID: 11159 ABORT: 3/3

ITEM: RJDF2B L5/F5/R5 MANIFOLD DRIVER SWITCH 15

FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 5, RJDF
- 5) RJDF2B L5/F5/R5 MANIFOLD DRIVER SWITCH 15

6) 7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 016 S15 PART NUMBER: 33V73A16S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

IF SWITCH SHORTS TO CASE, 1 AMP FUSE WILL BLOW. FAILURE WILL RESULT IN THE LOSS OF DRIVER POWER TO THE L5/F5/R5, RESULTING IN LOSS OF THE VERNIER RCS, AND MAY AFFECT ON-ORBIT OPERATIONS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11160 ABORT: 3/2R

ITEM: MANIFOLD 1, JETS HEATER CONTROL SWITCH 14

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 1, JETS
- 5) MANIFOLD 1, JETS HEATER CONTROL SWITCH 14

6) 7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	: 3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL A14 S14 PART NUMBER: 36V73A14S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

PROPELLANTS IN JETS ON MANIFOLD 1 MAY FREEZE. THIS CAUSES LOSS OF JETS ON THE MANIFOLD. REDUNDANCY PROVIDED BY MANIFOLD 3 JETS. LOSS OF ALL REDUNDANCY MAY PREVENT ON-ORBIT OPERATIONS THUS MISSION OBJECTIVES.

### REFERENCES:

REPORT DATE: 2/26/88 E-202

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE: FLIGHT: 3/3 SUBSYSTEM: FRCS

ABORT: 3/3 MDAC ID: 11161

MANIFOLD 1, JETS HEATER CONTROL SWITCH 14 ITEM:

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 1, JETS
- 5) MANIFOLD 1, JETS HEATER CONTROL SWITCH 14

6) 7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S14 PART NUMBER: 36V73A14S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. REQUIRES ADDITIONAL FAILURE (THERMOSTAT) TO CAUSE

OVERHEATING OF PROPELLANTS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11162 ABORT: 3/2R

ITEM: MANIFOLD 1, JETS HEATER CONTROL SWITCH 14

FAILURE MODE: SWITCH FAILS SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 1, JETS
- 5) MANIFOLD 1, JETS HEATER CONTROL SWITCH 14

6) 7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING	3/3		·

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL A14 S14 PART NUMBER: 36V73A14S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

PROPELLANTS IN JETS ON MANIFOLD 1 MAY FREEZE, CAUSING LOSS OF JETS. REDUNDANCY PROVIDED BY MANIFOLD 3 JETS. LOSS OF ALL REDUNDANCY MAY PREVENT ON-ORBIT OPERATIONS THUS MISSION OBJECTIVES.

#### REFERENCES:

REPORT DATE : 2/26/88 E-204

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: FRCS FLIGHT: 3/3 MDAC ID: 11163 ABORT: 3/3

ITEM: MANIFOLD 1, JETS HEATER CONTROL SWITCH 14

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 1, JETS
- 5) MANIFOLD 1, JETS HEATER CONTROL SWITCH 14
- 6)
- 7) 8)
- 9)

### CRITICALITIES

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FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S14 PART NUMBER: 36V73A14S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11164 ABORT: 3/2R

ITEM: MANIFOLD 1, JETS HEATER CONTROL SWITCH 14

FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 1, JETS
- 5) MANIFOLD 1, JETS HEATER CONTROL SWITCH 14

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8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		•
ONORBIT: DEORBIT:	3/2R 3/3	AOA:	3/: 3/:

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL A14 S14 PART NUMBER: 36V73A14S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

SHORT TO CASE WILL BLOW 7.5 AMP FUSE. PROPELLANTS IN JETS ON MANIFOLD 1 MAY FREEZE, CAUSING LOSS OF JETS. REDUNDANCY PROVIDED BY JETS ON MANIFOLD 3. LOSS OF ALL REDUNDANCY MAY PREVENT ON-ORBIT OPERATIONS THUS MISSION OBJECTIVES.

E-206

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11165 ABORT: 3/2R

ITEM: MANIFOLD 2, JETS HEATER CONTROL SWITCH 15

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 2, JETS
- 5) MANIFOLD 2, JETS HEATER CONTROL SWITCH 15

6) 7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/2R	ATO:	3/2R
LANDING/SAFING:	3/3		

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL A14 S15 PART NUMBER: 36V73A14S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

PROPELLANTS IN JETS ON MANIFOLD 2 WILL FREEZE CAUSING LOSS OF JETS. REDUNDANCY PROVIDED BY JETS ON MANIFOLD 4. LOSS OF ALL REDUNDANCY MAY PREVENT ON-ORBIT OPERATIONS THUS MISSION OBJECTIVES.

10/01/87 DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3 MDAC ID: 11166 ABORT: 3/3

MANIFOLD 2, JETS HEATER CONTROL SWITCH 15 ITEM:

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 2, JETS
- 5) MANIFOLD 2, JETS HEATER CONTROL SWITCH 15

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#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S15 PART NUMBER: 36V73A14S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

NO EFFECT. REQUIRES ADDITIONAL FAILURE (THERMOSTAT) TO CAUSE OVERHEATING OF PROPELLANTS.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

SUBSYSTEM: FRCS FLIGHT: 3/2R ABORT: 3/2R 3/2R MDAC ID: 11167

MANIFOLD 2, JETS HEATER CONTROL SWITCH 15 ITEM:

FAILURE MODE: SWITCH FAILS SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 2, JETS
- 5) MANIFOLD 2, JETS HEATER CONTROL SWITCH 15

6) 7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL A14 S15 PART NUMBER: 36V73A14S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

PROPELLANTS IN JETS ON MANIFOLD 2 MAY FREEZE, CAUSING LOSS OF JETS. REDUNDANCY PROVIDED BY MANIFOLD 4 JETS. LOSS OF ALL REDUNDANCY MAY PREVENT ON-ORBIT OPERATIONS THUS MISSION OBJECTIVES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3 MDAC ID: 11168 ABORT: 3/3

ITEM: MANIFOLD 2, JETS HEATER CONTROL SWITCH 15

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 2, JETS
- 5) MANIFOLD 2, JETS HEATER CONTROL SWITCH 15

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### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S15 PART NUMBER: 36V73A14S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

### REFERENCES:

REPORT DATE : 2/26/88 E-210

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

FLIGHT: 3/2R ABORT: 3/2R SUBSYSTEM: FRCS 3/2R ABORT: MDAC ID: 11169

MANIFOLD 2, JETS HEATER CONTROL SWITCH 15 ITEM:

FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- THRUSTER 2)
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 2, JETS
- 5) MANIFOLD 2, JETS HEATER CONTROL SWITCH 15

6) 7)

8) 9)

#### CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/3	RTLS:	3/3
3/3	TAL:	3/3
3/2R	AOA:	3/3
3/3	ATO:	3/2R
3/3		
	3/3 3/3 3/2R 3/3	3/3 RTLS: 3/3 TAL: 3/2R AOA: 3/3 ATO:

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL A14 S15 PART NUMBER: 36V73A14S15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

SHORT TO CASE WILL BLOW 7.5 AMP FUSE. PROPELLANTS IN JETS ON MANIFOLD 2 MAY FREEZE, CAUSING LOSS OF JETS. REDUNDANCY PROVIDED BY JETS ON MANIFOLD 4. LOSS OF ALL REDUNDANCY MAY PREVENT ON-ORBIT OPERATIONS THUS MISSION OBJECTIVES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11170 ABORT: 3/2R

ITEM: MANIFOLD 3, JETS HEATER CONTROL SWITCH 16

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 3, JETS
- 5) MANIFOLD 3, JETS HEATER CONTROL SWITCH 16

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7)

8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL A14 S16 PART NUMBER: 36V73A14S16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

PROPELLANTS IN JETS ON MANIFOLD 3 MAY FREEZE CAUSING LOSS OF JETS. REDUNDANCY PROVIDED BY JETS ON MANIFOLD 1. LOSS OF ALL REDUNDANCY MAY PREVENT ON-ORBIT OPERATIONS THUS MISSION OBJECTIVES.

#### REFERENCES:

REPORT DATE : 2/26/88 E-212

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: FRCS FLIGHT: 3/3 MDAC ID: 11171 ABORT: 3/3

ITEM: MANIFOLD 3, JETS HEATER CONTROL SWITCH 16

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 3, JETS
- 5) MANIFOLD 3, JETS HEATER CONTROL SWITCH 16

6) 7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	•		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S16 PART NUMBER: 36V73A14S16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. REQUIRES ADDITIONAL FAILURE (THERMOSTAT) TO CAUSE

OVERHEATING OF PROPELLANTS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11172 ABORT: 3/2R

ITEM: MANIFOLD 3, JETS HEATER CONTROL SWITCH 16

FAILURE MODE: SWITCH FAILS SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 3, JETS
- 5) MANIFOLD 3, JETS HEATER CONTROL SWITCH 16

6) 7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		•

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL A14 S16
PART NUMBER: 36V73A14S16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

PROPELLANTS IN MANIFOLD 3 MAY FREEZE, CAUSING LOSS OF JETS. REDUNDANCY PROVIDED BY MANIFOLD 1 JETS. LOSS OF ALL REDUNDANCY MAY PREVENT ON-ORBIT OPERATIONS THUS MISSION OBJECTIVES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: FRCS FLIGHT: 3/3

SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 11173
ABORT: 3/3

ITEM: MANIFOLD 3, JETS HEATER CONTROL SWITCH 16

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 3, JETS
- 5) MANIFOLD 3, JETS HEATER CONTROL SWITCH 16

6) 7)

8)

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## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:			

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S16 PART NUMBER: 36V73A14S16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R

MDAC ID: 11174 ABORT: 3/2R

ITEM: MANIFOLD 3, JETS HEATER CONTROL SWITCH 16

FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 3, JETS
- 5) MANIFOLD 3, JETS HEATER CONTROL SWITCH 16

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		J, 210

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL A14 S16 PART NUMBER: 36V73A14S16

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

SHORT TO CASE WILL BLOW 7.5 AMP FUSE. PROPELLANTS IN JETS ON MANIFOLD 3 MAY FREEZE, CAUSING LOSS OF JETS. REDUNDANCY PROVIDED BY JETS ON MANIFOLD 1. LOSS OF ALL REDUNDANCY MAY PREVENT ON-ORBIT OPERATIONS THUS MISSION OBJECTIVES.

### REFERENCES:

REPORT DATE : 2/26/88 E-216

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11175 ABORT: 3/2R

ITEM: MANIFOLD 4, JETS HEATER CONTROL SWITCH 17

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 4, JETS
- 5) MANIFOLD 4, JETS HEATER CONTROL SWITCH 17
- 6) 7)
- 8)
- 9)

#### CRITICALITIES

ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 3/3 3/3 3/3 3/2R
	RTLS: TAL: AOA:

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL A14 S17 PART NUMBER: 36V73A14S17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

PROPELLANTS IN JETS ON MANIFOLD 4 MAY FREEZE, CAUSING LOSS OF JETS. REDUNDANCY PROVIDED BY JETS ON MANIFOLD 2. LOSS OF ALL REDUNDANCY MAY PREVENT ON-ORBIT OPERATIONS THUS MISSION OBJECTIVES.

#### REFERENCES:

REPORT DATE : 2/26/88 E-217

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3
MDAC ID: 11176 ABORT: 3/3

ITEM: MANIFOLD 4, JETS HEATER CONTROL SWITCH 17

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 4, JETS
- 5) MANIFOLD 4, JETS HEATER CONTROL SWITCH 17

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CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		٠,٠

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S17 PART NUMBER: 36V73A14S17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. REQUIRES ADDITIOANL FAILURE (THERMOSTAT) TO CAUSE

OVERHEATING OF PROPELLANTS.

DATE: 10/01/87 SUBSYSTEM: FRCS HIGHEST CRITICALITY HDW/FUNC

FLIGHT: 3/2R ABORT: 3/2R 3/2R MDAC ID: 11177

MANIFOLD 4, JETS HEATER CONTROL SWITCH 17 ITEM:

FAILURE MODE: SWITCH FAILS SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 4, JETS 5) MANIFOLD 4, JETS HEATER CONTROL SWITCH 17

6) 7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL A14 S17 PART NUMBER: 36V73A14S17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

PROPELLANTS IN MANIFOLD 4 MAY FREEZE, CAUSING LOSS OF JETS. REDUNDANCY PROVIDED BY MANIFOLD 2 JETS. LOSS OF ALL REDUNDANCY MAY PREVENT ON-ORBIT OPERATIONS THUS MISSION OBJECTIVES.

HIGHEST CRITICALITY HDW/FUNC

DATE: 10/01/87 SUBSYSTEM: FRCS FLIGHT: 3/3 ABORT: 3/3 MDAC ID: 11178

MANIFOLD 4, JETS HEATER CONTROL SWITCH 17 ITEM:

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 4, JETS
- 5) MANIFOLD 4, JETS HEATER CONTROL SWITCH 17

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#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S17 PART NUMBER: 36V73A14S17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE:

10/01/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS

FLIGHT: 3/2R

MDAC ID: 11179

ABORT:

3/2R

ITEM:

MANIFOLD 4, JETS HEATER CONTROL SWITCH 17

FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- THRUSTER 2)
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 4, JETS
- MANIFOLD 4, JETS HEATER CONTROL SWITCH 17 5)

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL A14 S17 PART NUMBER: 36V73A14S17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SHORT TO CASE WILL BLOW 5 AMP FUSE. PROPELLANTS IN JETS ON MANIFOLD 4 MAY FREEZE, CAUSING LOSS OF JETS. REDUNDANCY PROVIDED BY JETS ON MANIFOLD 2. LOSS OF ALL REDUNDANCY MAY PREVENT ON-ORBIT OPERATIONS THUS MISSION OBJECTIVES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/2 MDAC ID: 11180 ABORT: 2/2

ITEM: MANIFOLD 5, JETS HEATER CONTROL SWITCH 18

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 5, JETS
- 5) MANIFOLD 5, JETS HEATER CONTROL SWITCH 18

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8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING:	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S18 PART NUMBER: 36V73A14S18

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

PROPELLANTS IN JETS ON MANIFOLD 5 MAY FREEZE, CAUSING LOSS OF JETS. NO REDUNDANCY PROVIDED FOR FORWARD VERNIERS, THUS MAY CAUSE LOSS OF MISSION OBJECTIVES.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE: FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: FRCS 3/3 MDAC ID: 11181 MANIFOLD 5, JETS HEATER CONTROL SWITCH 18 ITEM: FAILURE MODE: SWITCH FAILS SHORT (WORST CASE) LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST BREAKDOWN HIERARCHY: 1) ELECTRICAL COMPONENTS 2) THRUSTER 3) THERMAL CONTROL SUBSYSTEM 4) MANIFOLD 5, JETS 5) MANIFOLD 5, JETS HEATER CONTROL SWITCH 18 6)

CRITICALITIES

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HDW/FUNC	ABORT	HDW/FUNC
3/3	RTLS:	3/3
3/3	TAL:	3/3
3/3	AOA:	3/3
3/3	ATO:	3/3
: 3/3		
	3/3 3/3 3/3 3/3	3/3 RTLS: 3/3 TAL: 3/3 AOA: 3/3 ATO:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S18 PART NUMBER: 36V73A14S18

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

7) 8) 9)

EFFECTS/RATIONALE:
NO EFFECT. REQUIRES ADDITIONAL FAILURE (THERMOSTAT) TO CAUSE OVERHEATING OF PROPELLANTS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/2 MDAC ID: 11182 ABORT: 2/2

ITEM: MANIFOLD 5, JETS HEATER CONTROL SWITCH 18
FAILURE MODE: SWITCH FAILS SHORT CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### **BREAKDOWN HIERARCHY:**

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 5, JETS
- 5) MANIFOLD 5, JETS HEATER CONTROL SWITCH 18

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#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING:	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S18 PART NUMBER: 36V73A14S18

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

PROPELLANTS IN MANIFOLD 5 MAY FREEZE CAUSING LOSS OF JETS. NO REDUNDANCY PROVIDED FOR FORWARD VERNIERS, THUS MAY CAUSE LOSS OF MISSION OBJECTIVES.

#### REFERENCES:

REPORT DATE : 2/26/88 E-224

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87 FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: FRCS

MDAC ID: 11183

MANIFOLD 5, JETS HEATER CONTROL SWITCH 18 ITEM:

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 5, JETS
- 5) MANIFOLD 5, JETS HEATER CONTROL SWITCH 18
- 6)
- 7) 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S18 PART NUMBER: 36V73A14S18

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/2 MDAC ID: 11184 ABORT: 2/2

MANIFOLD 5, JETS HEATER CONTROL SWITCH 18 ITEM:

FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 5, JETS
- MANIFOLD 5, JETS HEATER CONTROL SWITCH 18

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#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING	: 3/3		·

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S18 PART NUMBER: 36V73A14S18

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

SHORT TO CASE WILL BLOW 5 AMP FUSE. PROPELLANTS IN JETS ON MANIFOLD 5 MAY FREEZE, CAUSING LOSS OF JETS. NO REDUNDANCY PROVIDED FOR FORWARD VERNIERS, THUS CAUSING LOSS OF MISSION OBJECTIVES.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 2/2 ABORT: 2/2 SUBSYSTEM: FRCS MDAC ID: 11185

SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS ITEM:

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) HTR SYSTEM A/B, OX
- 5) SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS

6) 7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING	•		-

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S3 PART NUMBER: 36V73A14S3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

OXIDIZER AND FUEL PROPELLANTS MAY FREEZE DUE TO INABILITY TO TURN ON PANEL HEATERS. MANEUVERING CAPABILITIES THUS MISSION OBJECTIVES MAY BE LIMITED IN ORDER FOR ORBITER TO WARM TANKS BY FACING THE SUN. NOTE: SWITCH DRAWN INCORRECTLY ON SHEMATIC VS-942099. REFER TO SPACE SHUTTLE SYSTEMS HANDBOOK.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3 MDAC ID: 11186 ABORT: 3/3

ITEM: SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) HTR SYSTEM A/B, OX
- 5) SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS

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7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S3 PART NUMBER: 36V73A14S3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

NO EFFECT. REQURIES ADDITIONAL FAILURE (THERMOSTAT) TO CAUSE OVERHEATING OF PROPELLANTS. NOTE: SWITCH DRAWIN INCORRECTLY ON SHEMATIC VS70-942099. REFER TO SPACE SHUTTLE SYSTEMS HANDBOOK.

### REFERENCES:

REPORT DATE: 2/26/88 E-228

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87 SUBSYSTEM: FRCS

FLIGHT: 2/2 2/2 ABORT: MDAC ID: 11187

SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS ITEM:

FAILURE MODE: SWITCH FAILS SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) HTR SYSTEM A/B, OX
  5) SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS

6) 7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT: DEORBIT: LANDING/SAFING:	2/2 3/3 : 3/3	AOA: ATO:	3/3 2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S3 PART NUMBER: 36V73A14S3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

OXIDIZER AND FUEL PROPELLANTS MAY FREEZE DUE TO INABILITY TO TURN ON PANEL HEATERS. MANEUVERING CAPABILITIES THUS MISSION OBJECTIVES MAY BE LIMITED. NOTE: SWITCH DRAWN INCORRECTLY ON SHEMATIC VS70-942099. REFER TO SPACE SHUTTLE SYSTEMS HANDBOOK.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3 MDAC ID: 11188 ABORT: 3/3

SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) THRUSTER
- 3) THERMAL CONTROL SUBSYSTEM
- 4) HTR SYSTEM A/B, OX
- 5) SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS

6) 7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		-, -

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S3 PART NUMBER: 36V73A14S3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

NO EFFECT. NOTE: SWITCH DRAWN INCORRECTLY ON SCHEMATIC VS70-942099. REFER TO SPACE SHUTTLE SYSTEMS HANDBOOK.

DATE:

10/01/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS

FLIGHT: 3/2R

MDAC ID:

11189

ABORT:

3/2R

ITEM:

SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS

FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- THRUSTER 2)
- THERMAL CONTROL SUBSYSTEM 3)
- 4) HTR SYSTEM A/B, OX
- SWITCH, TOGGLE RCS/OMS HEATERS FWD RCS 5)

6)

7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	<b>:</b> 3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PNL A14 S3

PART NUMBER: 36V73A14S3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH SHORTS TO CASE, ASSOCIATED 1 AMP FUSE WITH BLOW. REDUNDANCY IS PROVIDED WITHIN THE SWITCH. LOSS OF ALL REDUNDANCY MAY CAUSE OXIDIZER AND FUEL PROPELLANTS TO FREEZE DUE TO INABILITY TO TURN ON PANEL HEATERS. MANEUVERING CAPABILITIES THUS MISSION OBJECTIVES MAY BE LIMITED. NOTE: SWITCH DRAWN INCORRECTLY ON SHEMATIC VS70-942099. REFER TO SPACE SHUTTLE SYSTEMS HANDBOOK. ALSO SPACE SHUTTLE SYSTEMS HANDBOOD SHOWS 3 AMP FUSES BUT SCHEMATIC VS70-942099 SHOWS 1 AMP FUSES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/3 MDAC ID: 11190 ABORT: 3/3

ITEM: SWITCH ROTARY, RCS/OMS PROPELLANT QUANTITY GAUGE

FAILURE MODE: FAILS TO SWITCH; (POLES STUCK IN ONE OF THREE

POSITION OR POLES FAIL TO MAKE CONTACT IN ANY POSITION)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) INSTRUMENTATION
- 3) PROP STOR & DIST SUBSYSTEM
- 4) SWITCH ROTARY, RCS/OMS PROPELLANT QUANTITY GAUGE

5)

6)

7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 03 S11 PART NUMBER: 33V73A3S11

CAUSES: CONTAMINATION, VIBRATION, PIECE-PART FAILURE, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE CAPABILITY TO SELECT OMS/RCS/KIT PROPELLANT QUANTITY FOR VISUAL DISPLAY ON METIER M12. THERE ARE TWO OTHER REDUNDANT MEASUREMENT PATHS FOR THE OMS AND ONE REDUNDANT PATH FOR RCS. IN THE OMS, ONE PATH IS THROUGH THE GPC THE OTHER HARDWIRED TO THE GSE PNL (J207). LOSS OF ALL QUANTITY PATHS HAVE NO EFFECT SINCE GROUND CALCULATIONS WOULD STILL BE AVAILABLE.

10/01/87 DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS

FLIGHT: 3/2R

MDAC ID: 11191

ABORT:

3/3

ITEM:

SWITCH ROTARY, RCS/OMS PRESS

FAILURE MODE: FAILS TO SWITCH; (POLES STUCK IN ONE OF THREE

POSITION OF POLES FAIL TO MAKE CONTACT IN ANY POSITION)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

1) ELECTRICAL COMPONENTS

2) INSTRUMENTATION

3) PROP STOR & DIST SUBSYSTEM

4) SWITCH ROTARY, RCS/OMS PRESS

5)

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 03 S10

PART NUMBER: 33V73A3S10

CAUSES: CONTAMINATION, VIBRATION, PIECE-PART FAILURE, OVERLOAD

# EFFECTS/RATIONALE:

LOSE CAPABILITY TO UTILIZE GAGES M9, M10, AND M11 FOR MONITORING. REDUNDANT MEASUREMENTS ARE AVAILABLE THROUGH GPC AND ARE PART OF THE C&W SYSTEM. THE LOSS OF ALL SIGNAL PATHS FOR OMS RT/LT/KIT PROP ULLAGE, RCS RT/LT/FWD PROP ULLAGE AND RCS RT/LT/FWD HE TK PRESSURE WOULD RESULT IN LOSS OF MISSION FOR SAFETY REASONS SINCE THE ACTUAL STATUS OF THE SYSTEMS ARE UNAVAILABLE.

REFERENCES: VS70-942099 REV C EO D01; VS70-943099 REV A EO B12

DATE: SUBSYSTEM: FRCS

10/01/87

HIGHEST CRITICALITY HDW/FUNC

MDAC ID:

FLIGHT:

3/3

11192

ABORT:

3/3

ITEM:

METER, RCS/OMS PROPELLANT QUANTITY GAUGE

FAILURE MODE: ERRONEOUS OUTPUT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) INSTRUMENTATION
- 3) PROP STOR & DIST SUBSYSTEM
- 4) METER, RCS/OMS PROPELLANT QUANTITY GAUGE

5) 6)

7)

8)

9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		٠,٠

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PNL 03 S12 PART NUMBER: 33V73A3S12

CAUSES: CONTAMINATION, VIBRATION, PIECE-PART FAILURE, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO SELECT OMS/RCS/KIT PROPELLANT QUANTITY FOR VISUAL DISPLAY ON METER M12. THERE ARE TWO OTHER REDUNDANT MEASUREMENT PATHS FOR THE OMS AND ONE REDUNDANT PATH FOR RCS. THE OMS, ONE PATH IS THROUGH THE GPC THE OTHER HARDWIRED TO THE GSE PNL (J207). LOSS OF ALL QUANTITY PATHS HAS NO EFFECT SINCE GROUND CALCULATIONS WOULD STILL BE AVAILABLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11193 ABORT: 3/3

ITEM: METER, RT OMS/RCS PRESSURE

FAILURE MODE: ERRONEOUS OUTPUT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) INSTRUMENTATION
- 3) PROP STOR & DIST SUBSYSTEM
- 4) METER, RT OMS/RCS PRESSURE

5)

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/2R	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 03 M11
PART NUMBER: 33V73A3M11

CAUSES: CONTAMINATION, VIBRATION, PIECE-PART FAILURE, OVERLOAD

#### EFFECTS/RATIONALE:

GAGE M11 PROVIDES A FALSE INDICATION OF RT OMS/RCS PROPELLANT ULLAGE AND RT RCS HE TANK PRESSURES. REDUNDANT GPC MEASUREMENT PATHS ARE AVAILABLE (RT OMS FU/OX V43P5321C/V43P5221C, RT RCS FU/OX V42P3116C/V42P3115C, RT RCS HE TANK OX/FU V42P3110C, V42P3112C/V42P3113C, V42P3114C). ERRONEOUS INDICATION FROM LOSS OF ALL REDUNDANCY IN PL & OO PHASES WOULD RESULT IN RT RCS HE TK BEING DECLARED FAILED RESULTING IN A LOSS OF DELTA V AND LOSS OF MISSION CAPABILITY (REF. FLIGHT RULE 6-41), UNLESS SENSOR FAILURE IS DETERMINED.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11194 ABORT: 3/3

ITEM: METER, LT OMS/RCS PRESSURE

FAILURE MODE: ERRONEOUS OUTPUT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) INSTRUMENTATION
- 3) PROP STOR & DIST SUBSYSTEM
- 4) METER, LT OMS/RCS PRESSURE
- 5)
- 6)
- 7) 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/2R	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 03 M9
PART NUMBER: 33V73A3M9

CAUSES: CONTAMINATION, VIBRATION, PIECE-PART FAILURE, OVERLOAD

#### EFFECTS/RATIONALE:

GAGE M9 PROVIDES A FALSE INDICATION OF LT OMS/RCS PROPELLANT ULLAGE AND LT RCS HE TANK PRESSURES. REDUNDANT GPC MEASUREMENT PATHS ARE AVAILABLE (LT OMS FU/OX V43P4321C/V43P4221C, LT RCS FU/OX V42P2116C/V42P2115C, LT RCS HE TANK OX/FU V42P2110C, V42P2112C/V42P2113C, V42P2114C). ERRONEOUS INDICATION FROM LOSS OF ALL REDUNDANCY IN PL & OO PHASES WOULD RESULT IN LT RCS HE TK BEING DECLARED FAILED RESULTING IN A LOSS OF DELTA V AND LOSS OF MISSION CAPABILITY (REF. FLIGHT RULE 6-41), UNLESS SENSOR FAILURE IS DETERMINED.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 2/1R ABORT: 1/1 SUBSYSTEM: FRCS MDAC ID: 11195

SIGNAL CONDITIONER OF2 ITEM:

FAILURE MODE: INCORRECT OR LOSS OF OUTPUT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) INSTRUMENTATION
- 3) THRUSTER SUBSYSTEM
- 4) THRUSTERS, FWD
- 5) SIGNAL CONDITIONER OF2

6)

7) 8)

9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	2/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: FORWARD BAY 2

PART NUMBER: 82V75A17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

CHAMBER PRESSURE SENSOR DATA IS ROUTED THROUGH SIGNAL CONDITIONER OF2. DATA RECEIVED AT GPC CAN DESELECT RCS JETS. THEREFORE INCORRECT DATA MAY DESELECT -Z JETS. REDUNDANCY PROVIDED BY JET ON DIFFERENT MANIFOLD. LOSS OF ALL REDUNDANCY MAY CAUSE LOSS OF JETS REQUIRED FOR ET SEPARATION.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11196 ABORT: 3/2R

ITEM: SIGNAL CONDITIONER OF3

FAILURE MODE: INCORRECT OR LOSS OF OUTPUT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- INSTRUMENTATION 2)
- 3) THRUSTER SUBSYSTEM
- 4) THRUSTERS, FWD
- 5) SIGNAL CONDITIONER OF3

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING / SARING .	2/2		,

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: FORWARD BAY 3A

PART NUMBER: 83V75A18

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

SIGNAL CONDITIONER CONTAINS HELIUM OXIDIZER TANK PRESSURE DATA. POSSIBLE LOSS OF MISSION DUE TO UNCERTAINTY ABOUT QUANTITY OF PROPELLANT.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 2/1R SUBSYSTEM: FRCS MDAC ID: 11197 ABORT: 1/1

ITEM:

SIGNAL CONDITIONER OF4

FAILURE MODE: INCORRECT OR LOSS OF OUTPUT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- INSTRUMENTATION
- 3) THRUSTER SUBSYSTEM
- 4) THRUSTERS, FWD
- 5) SIGNAL CONDITIONER OF4

6)

7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	2/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING	: 3/3		·

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: FORWARD FUSELAGE

PART NUMBER: 22V75A22

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

CHAMBER PRESSURE SENSOR DATA IS ROUTED THROUGH SIGNAL CONDITIONER OF2. DATA RECEIVED AT GPC CAN DESELECT RCS JETS. THEREFORE, INCORRECT DATA MAY DESELECT -Z JETS. REDUNDANCY PROVIDED BY JET ON DIFFERENT MANIFOLD. LOSS OF ALL REDUNDANCY MAY CAUSE LOSS OF JETS REQUIRED FOR ET SEPARATION.

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87 FLIGHT: SUBSYSTEM: FRCS ABORT: 11198 MDAC ID: JET DRIVER (PRIMARY-ALL) ITEM: FAILURE MODE: JET DRIVER FAILS OFF LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST BREAKDOWN HIERARCHY: ELECTRICAL COMPONENTS 1) 2) CONTROLS THRUSTER SUBSYSTEM 3) THRUSTERS, FWD 4) JET DRIVER (PRIMARY-ALL) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT HDW/FUNC FLIGHT PHASE PRELAUNCH: RTLS: TAL: LIFTOFF: AOA: ONORBIT: ATO: DEORBIT: LANDING/SAFING:

LOCATION: WITHIN RJDF #1 & RJDF #2

PART NUMBER: 81V79A8 & 82V79A9

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSS OF JET ASSOCIATED WITH +Y, -Y, OR -Z THRUST COMPONENT IS THE WORST CASE. REDUNDANCY FOR JET PROVIDED BY JET ON DIFFERENT MANIFOLD. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND FRCS DUMP.

REFERENCES: VS70-942099 REV C EO D01; JSC-20923 PCN-1

REPORT DATE : 2/26/88 E-240

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE: FLIGHT: / SUBSYSTEM: FRCS ABORT: MDAC ID: 11199 JET DRIVER (PRIMARY-ALL) ITEM: FAILURE MODE: JET DRIVER FAILS ON LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST BREAKDOWN HIERARCHY: 1) ELECTRICAL COMPONENTS 2) CONTROLS 3) THRUSTER SUBSYSTEM 4) THRUSTERS, FWD JET DRIVER (PRIMARY-ALL) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT HDW/FUNC FLIGHT PHASE RTLS: TAL: PRELAUNCH: / / LIFTOFF: AOA: ONORBIT: ATO: DEORBIT: LANDING/SAFING: REDUNDANCY SCREENS: A [ ] B [ ] C [ ] LOCATION: WITHIN RJDF #1 & RJDF #2 PART NUMBER: 81V79A8 & 82V79A9 CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD EFFECTS/RATIONALE: JET DRIVER FAILED ON WILL PROVIDE LATCHING ENERGY TO BI-PROPELLANT VALVES ALLOWING FIRING. CREW MUST ISOLATE PROPELLANT BY CLOSING ASSOCIATED MANIFOLD. INADVERTENT FIRING DURING ANY

REFERENCES: VS70-942099 REV C EO D01; JSC-20923 PCN-1

MISSION PHASE MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: FRCS FLIGHT: MDAC ID: 11200 ABORT: ITEM: JET DRIVER (VERNIER-ALL) FAILURE MODE: JET DRIVER FAILS OFF LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST BREAKDOWN HIERARCHY: 1) ELECTRICAL COMPONENTS

- 2) CONTROLS
  3) THRUSTER SUBSYSTEM
- 4) THRUSTERS, FWD
- 5) JET DRIVER (VERNIER-ALL)
- 6) 7)
- 8)
- 9)

#### CRITICALITIES

	~			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	/	RTLS:	1	
LIFTOFF:	/	TAL:	,	
ONORBIT:	/	AOA:	,	
DEORBIT:		ATO:	,	
LANDING/SAFING	: /		•	

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: WITHIN RJDF #1 & RJDF #2

PART NUMBER: 81V79A8 & 82V79A9

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE JET ASSOCIATED WITH +Y, OR -Y VERNIER THRUST COMPONENT. NO REDUNDANCY PROVIDED. THIS MAY CAUSE LOSS OF MISSION OBJECTIVES DUE TO LOSS OF VERNIERS.

REFERENCES: VS70-942099 REV C EO D01; JSC-20923 PCN-1

REPORT DATE : 2/26/88 E-242

DATE: 10/01/8 SUBSYSTEM: FRCS MDAC ID: 11201	37	I	RITICALITY FLIGHT: ABORT:	HDW/FUNC / /
ITEM: JET FAILURE MODE: JET	DRIVER (VERNIER-A) DRIVER FAILS ON	LL)		
LEAD ANALYST: D. H	ARTMAN SUBSY:	E LEAD: C.I	). PRUST	
BREAKDOWN HIERARCHY  1) ELECTRICAL CONTROLS  2) CONTROLS  3) THRUSTER SUBSY  4) THRUSTERS, FWI  5) JET DRIVER (VI  6)  7)  8)  9)	MPONENTS YSTEM			
	CRITICALI	TIES		
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	2
PRELAUNCH:	/	RTLS:	/,	
LIFTOFF:	/ /	TAL:	/,	
ONORBIT: DEORBIT:	/	AOA:		
DEORBIT:	,	ATO:	/	
LANDING/SAF	ING: /			
REDUNDANCY SCREENS	: A [ ] B	[ ]	c [ ]	
LOCATION: WITH PART NUMBER: 81V7	IN RJDF #1 & RJDF 9A8 & 82V79A9	#2		
CAUSES: CONTAMINA SHOCK, OVERLOAD	TION, VIBRATION, M	ECHANICAL	SHOCK, THE	RMAL
EFFECTS/RATIONALE: JET DRIVER FAILED PROPELLANT VALVES BY CLOSING MANIFOL	ON WILL PROVIDE LA ALLOWING FIRING.	CREW MUST	ISOLATE PRO	OPELLANT

REFERENCES: VS70-942099 REV C EO DO1; JSC-20923 PCN-1

MISSION PHASE MAY CAUSE LOSS OF CREW/VEHICLE.

10/01/87 HIGHEST CRITICALITY HDW/FUNC DATE:

FLIGHT: 2/1R SUBSYSTEM: FRCS MDAC ID: 11202 ABORT: 3/2R

ITEM: DIODE

FAILURE MODE: FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) HE PRESS SUBSYSTEM
- 4) HE OX & FU ISOL A & B VLVS
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	2/1R	ATO:	3/2R
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

22V42LV102, 22V42LV101 LOCATION:

PART NUMBER: J1-1 (FOUR DIODES), J1-1 (FOUR DIODES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

FAILED OPEN DIODE ASSOCIATED WITH "OPEN" SOLENOID PREVENTS VALVE FROM BEING OPENED. REDUNDANCY PROVIDED BY OTHER VALVE. LOSS OF THIS MAY PREVENT FRCS DUMP REQUIRED TO EXPEL PROPELLANTS TO MEET C.G. BOUNDARIES.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE: FLIGHT: 3/3 SUBSYSTEM: FRCS 3/3 ABORT: MDAC ID: 11203 ITEM: DIODE FAILURE MODE: FAILS SHORT (WORST CASE) LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST BREAKDOWN HIERARCHY: 1) ELECTRICAL COMPONENTS 2) CONTROLS 3) HE PRESS SUBSYSTEM 4) HE OX & FU ISOL A & B VLVS 5) DIODE 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT HDW/FUNC
3/3 RTLS: 3/3
3/3 TAL: 3/3
3/3 AOA: 3/3 FLIGHT PHASE PRELAUNCH: LIFTOFF: ONORBIT: ATO: 3/3 DEORBIT: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 22V42LV102, 22V42LV101

LANDING/SAFING: 3/3

PART NUMBER: J1-1 (FOUR DIODES), J1-1 (FOUR DIODES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11204 ABORT: 3/2R

ITEM: MICROSWITCH

FAILURE MODE: ERRONEOUS OUTPUT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) HE PRESS SUBSYSTEM
- 4) HE OX & FU ISOL A & B VLVS
- 5) MICROSWITCH
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		, and the second

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: 22V42LV102, 22V42LV101 PART NUMBER: J1-6 (FOUR SWITCHES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

FAILED MICROSWITCH PREVENTS ACCURATE VALVE POSITION DATA.
REDUNDANCY PROVIDED BY OTHER VALVE. LOSS OF TALKBACK MAY LEAD TO
FALSELY FAILING THE VALVE CLOSED THUS LIMITING ON-ORBIT
OPERATIONS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11205 ABORT: 3/1R

ITEM: MICROSWITCH

FAILURE MODE: ERRONEOUS OUTPUT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) OX & FU TK ISOL 1/2
- 5) MICROSWITCH
- 6)
- 7)
- 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	•		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: 22V42LV162, 22V42LV161
PART NUMBER: J1-F (BOTH MICROSWITCHES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

MICROSWITCH FAILED ACROSS CLOSE CONTACTS WILL NOT ALLOW VALVE TO BE CLOSED. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY PREVENTS ISOLATION OF A THRUSTER LEAK.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11206 ABORT: 3/1R

ITEM: MICROSWITCH

FAILURE MODE: ERRONEOUS OUTPUT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) OX & FU TK ISOL 3/4/5
- 5) MICROSWITCH
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/1R	RTLS:	3/1R
3/1R	TAL:	3/1R
3/1R	AOA:	3/1R
3/1R	ATO:	3/1R
: 3/1R		,
	3/1R 3/1R 3/1R 3/1R	3/1R RTLS: 3/1R TAL: 3/1R AOA: 3/1R ATO:

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: 22V42LV163, 22V42LV164 PART NUMBER: J1-F (BOTH MICROSWITCHES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

MICROSWITCH FAILED ACROSS CLOSE CONTACTS WILL NOT ALLOW VALVE TO BE CLOSED. THIS, COUPLED WITH THE LOS OF ALL HARDWARE REDUNDANCY PREVENTS ISOLATION OF A THRUSTER LEAK.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11207 ABORT: 3/2R

ITEM: MICROSWITCH

FAILURE MODE: ERRONEOUS OUTPUT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1, OX & FU ISOL VLVS.
- 5) MICROSWITCH
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: 22V42LV117, 22V42LV118
PART NUMBER: J1-F (BOTH MICROSWITCHES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

MICROSWITCH FAILURE ACROSS EITHER CONTACTS WILL PROVIDE AN INACCURATE TALKBACK. THIS MAY LEAD TO FALSELY FAILING THE VALVE CLOSED.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11208 ABORT: 3/2R

ITEM: MICROSWITCH

FAILURE MODE: ERRONEOUS OUTPUT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 2, OX & FU ISOL VLVS.
- 5) MICROSWITCH
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		·

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: 22V42LV127, 22V42LV128
PART NUMBER: J1-F (BOTH MICROSWITCHES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

MICROSWITCH FAILURE ACROSS EITHER CONTACTS WILL PROVIDE AN INACCURATE TALKBACK DISPLAY. THIS MAY LEAD TO FALSELY FAILING THE VALVE CLOSED.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/2R ABORT: 3/2R SUBSYSTEM: FRCS MDAC ID: 11209

MICROSWITCH ITEM:

FAILURE MODE: ERRONEOUS OUTPUT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 3, OX & FU ISOL VLVS. 5) MICROSWITCH
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	3/3	
LIFTOFF:	3/3	TAL:	3/3	
ONORBIT:	3/2R	AOA:	3/3	
DEORBIT:	3/3	ATO:	3/2R	
LANDING/SAFING	: 3/3			

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: 22V42LV137, 22V42LV138 PART NUMBER: J1-F (BOTH MICROSWITCHES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

MICROSWITCH FAILURE ACROSS EITHER CONTACTS WILL PROVIDE AN INACCURATE TALKBACK DISPLAY. THIS MAY LEAD TO FALSELY FAILING THE VALVE CLOSED.

REFERENCES: VS70-942099 REV D EO D01

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/2R MDAC ID: 11210 ABORT: 3/2R

ITEM: MICROSWITCH

FAILURE MODE: ERRONEOUS OUTPUT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, OX & FU ISOL VLVS.
- 5) MICROSWITCH
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: 22V42LV147, 22V42LV148
PART NUMBER: J1-F (BOTH MICROSWITCHES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

MICROSWITCH FAILURE ACROSS EITHER CONTACTS WILL PROVIDE AN INACCURATE TALKBACK DISPLAY. THIS MAY LEAD TO FALSELY FAILING THE VALVE CLOSED.

REFERENCES: VS70-942099 REV D EO DO1

REPORT DATE : 2/26/88 E-252

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11211 ABORT: 3/1R

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) HE PRESS SUBSYSTEM
- 4) HE OX & FU ISOL A & B VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	•		

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: F BAY 1, PCA 1; F BAY 2, PCA 2

PART NUMBER: 81V76A22CR37; 82V76A23CR8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY OPEN THE VALVE. REDUNDANCY PROVIDED WITH THE GPC. LOSS OF THIS, COUPLED WITH THE LOSS OF HARDWARE REDUNDANCY PREVENTS PROPELLANT TO BE EXPELLED TO MEET C.G. CONSTRAINTS.

REFERENCES: VS70-942099 REV D EO D01

HIGHEST CRITICALITY HDW/FUNC

DATE: 10/01/87 SUBSYSTEM: FRCS FLIGHT: 3/1R ABORT: 3/1R MDAC ID: 11212

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) HE PRESS SUBSYSTEM
- 4) HE OX & FU ISOL A & B VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/3	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
TANDING /CARING.	2/2		•

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: F BAY 1, PCA 1; F BAY 2, PCA 2

PART NUMBER: 81V76A22CR13; 82V76A23CR7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN THE VALVE WITH THE GPC. REDUNDANCY PROVIDED WITH MANUAL SWITCH. LOSS OF THIS, COUPLED WITH THE LOSS OF HARDWARE REDUNDANCY PREVENTS PROPELLANTS TO BE EXPELLED TO MEET LANDING WEIGHT.

REFERENCES: VS70-942099 REV D EO D01

REPORT DATE: 2/26/88 E-254

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/1R MDAC ID: 11213 ABORT: 1/1

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 1, RJDF
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	3/2R
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22CR35

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE MANIFOLD 1 DRIVER POWER THUS LOSS OF JETS ON MANIFOLD 1. REDUNDANCY PROVIDED BY JETS ON MANIFOLD 3. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED TO EXPEL PROPELLANTS TO MEET C.G. CONSTRAINTS.

REFERENCES: VS70-943099 REV D EO B12

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/1R MDAC ID: 11214 ABORT: 1/1

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 2, RJDF
- 5) DIODE
- 6)
- 7)
- 8) 9)

### CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/3	RTLS:	1/1
3/1R	TAL:	1/1
3/2R	AOA:	2/1R
2/1R	ATO:	3/2R
3/3		•
	3/3 3/1R 3/2R 2/1R	3/3 RTLS: 3/1R TAL: 3/2R AOA: 2/1R ATO:

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: F BAY 2, PCA 2 PART NUMBER: 81V76A23CR40

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE MANIFOLD 2 DRIVER POWER THUS LOSS OF JETS ON MANIFOLD 2. REDUNDANCY PROVIDED BY JETS ON MANIFOLD 4. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED TO EXPEL PROPELLANTS TO MEET C.G. CONSTRAINTS.

REFERENCES: VS70-943099 REV D EO B12

REPORT DATE: 2/26/88 E-256

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11215 ABORT: 2/1R

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 3, RJDF
- 5) DIODE
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	•		-

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: F BAY 1, PCA 1
PART NUMBER: 81V76A22CR49

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE ONE CIRCUIT FOR MANIFOLD 3 DRIVER POWER. ELECTRICAL REDUNDANCY PROVIDED. HARDWARE REDUNDANCY PROVIDED BY JETS ON MANIFOLD 1. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND TO EXPEL PROPELLANTS TO MEET C.G. CONSTRAINTS.

REFERENCES: VS70-943099 REV D EO B12

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11216 ABORT: 2/1R

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 3, RJDF
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		·

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1CR26

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE ONE CIRCUIT FOR MANIFOLD 3 DRIVER POWER. ELECTRICAL REDUNDANCY PROVIDED. HARDWARE REDUNDANCY PROVIDED BY JETS ON MANIFOLD 1. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND TO EXPEL PROPELLANTS TO MEET C.G. CONSTRAINTS.

REFERENCES: VS70-943099 REV D EO B12

REPORT DATE: 2/26/88 E-258

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/1R MDAC ID: 11217 ABORT: 1/1

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 4, RJDF
- 5) DIODE
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	3/2R
LANDING/SAFING:	•		

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: F BAY 3A, PCA 3
PART NUMBER: 83V76A24A1CR25

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE MANIFOLD 4 DRIVER POWER THUS LOSS OF JETS ON MANIFOLD 4. REDUNDANCY PROVIDED BY JETS ON MANIFOLD 2. LOSS OF ALL

REDUNDANCY CAUSES LOSS OF JETS REQUIRED TO MEET C.G. CONSTRAINTS.

REFERENCES: VS70-943099 REV D EO B12

**DATE:** 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/2 MDAC ID: 11218 ABORT: 2/2

ITEM:

DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM 4) MANIFOLD F5, RJDF
- 5) DIODE

6)

7)

8) 9)

CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/3	RTLS:	3/3
3/3	TAL:	3/3
2/2	AOA:	3/3
3/3	ATO:	2/2
3/3		•
	3/3 3/3 2/2 3/3	3/3 RTLS: 3/3 TAL: 2/2 AOA: 3/3 ATO:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: F BAY 3A, PCA 3 PART NUMBER: 83V76A24A1CR31

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE VERNIER DRIVER POWER WHICH CAUSES LOSS OF VERNIER JETS THUS LOSS OF MISSION.

REFERENCES: VS70-943099 REV D EO B12

REPORT DATE: 2/26/88 E-260

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11219 ABORT: 2/1R

ITEM:

DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 3, RJDF
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	•		

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: F BAY 1, PCA 1
PART NUMBER: 83V76A22A1CR47

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

LOSE ONE CIRCUIT FOR MANIFOLD 3 LOGIC POWER. ELECTRICAL REDUNDANCY PROVIDED. HARDWARE REDUNDANCY PROVIDED BY JETS ON MANIFOLD 1. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND TO EXPEL PROPELLANTS TO MEET C.G. CONSTRAINTS.

REFERENCES: VS70-943099 REV D EO B12

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

SUBSYSTEM: FRCS FLIGHT: 3/1R MDAC ID: 11220 ABORT: 2/1R

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 3, RJDF
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		•

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: F BAY 1, PCA 1 PART NUMBER: 83V76A22A1CR48

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE ONE CIRCUIT FOR MANIFOLD 3 LOGIC POWER. ELECTRICAL REDUNDANCY PROVIDED. HARDWARE REDUNDANCY PROVIDED BY JETS ON MANIFOLD 1. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND TO EXPEL PROPELLANTS TO MEET C.G. CONSTRAINTS.

REFERENCES: VS70-943099 REV D EO B12

REPORT DATE: 2/26/88 E-262

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: FRCS FLIGHT: 2/2 MDAC ID: 11221 ABORT: 2/2

ITEM:

DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 5, OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: F BAY 1, PCA 1 PART NUMBER: 81V76A22CRJ7-e

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVE. INABILITY TO OPEN ISOLATION VALVE PREVENTS VRCS OPERATION THUS LOSS OF MISSION.

REFERENCES: VS70-943099 REV D EO B12

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12001 ABORT: 3/1R

ITEM: FUSE, 1A FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) FUSE, 1A
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		•

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: PNL 07 S26; S31 PART NUMBER: 33V73A7 F26; F32

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO INHIBIT THE GROUND DRIVER MANUALLY. GROUND DRIVER CAN STILL BE INHIBITED BY MDM FA4. LOSS OF THIS COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY PREVENTS ISOLATION OF A THRUSTER LEAK.

REFERENCES: ECN 102-8023A

REPORT DATE : 2/26/88 E-264

HIGHEST CRITICALITY HDW/FUNC

DATE: 10/01/87 SUBSYSTEM: ARCS FLIGHT: 3/1R ABORT: 3/1R MDAC ID: 12002

ITEM: FUSE, 1A FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) FUSE, 1A
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		•

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: PNL 07 S26; S31 PART NUMBER: 33V73A7 F25; F31

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY OPEN OR CLOSE THE ISOLATION VALVE WITH THE SWITCH. GPC VALVE CONTROL IS STILL OPERABLE. LOSS OF ALL REDUNDANCY PREVENTS ISOLATION OF A THRUSTER LEAK.

REFERENCES: ECN 102-8023A

E-265 REPORT DATE: 2/26/88

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12003 ABORT: 3/1R

ITEM: MANIFOLD #5, L/R OX & FU ISOL VLV SWITCH

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) MANIFOLD 5, L/R OX & FU ISOL VLV SWITCH
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: PNL 07 S26; PNL 07 S31

PART NUMBER: 33V73A7 S26; S31

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE ISOLATION VALVE. INABILITY TO CLOSE ISOLATION VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12004 ABORT: 3/1R

ITEM: MANIFOLD #5, L/R OX & FU ISOL VLV SWITCH

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) MANIFOLD 5, L/R OX & FU ISOL VLV SWITCH

6) 7)

8)

9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	: 3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: PNL 07 S26; S31 PART NUMBER: 33V73A7 S26; S31

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE ISOLATION VALVE. INABILITY TO CLOSE ISOLATION VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH LOSS OF HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12005 ABORT: 3/1R

ITEM: MANIFOLD #5, L/R OX & FU ISOL VLV SWITCH FAILURE MODE: SWITCH SHORTS ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) MANIFOLD 5, L/R OX & FU ISOL VLV SWITCH
- 6) 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	3: 3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: PNL 07 S26; S31 PART NUMBER: 33V73A7 S26; S31

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE ISOLATION VALVE. INABILITY TO CLOSE ISOLATION VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH LOSS OF HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

REFERENCES: ECN 102-8023A

REPORT DATE: 2/26/88 E-268

DATE:

10/01/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS

FLIGHT: 3/1R

MDAC ID: 12006

ABORT:

3/1R

ITEM:

MANIFOLD #5, L/R OX & FU ISOL VLV SWITCH

FAILURE MODE: SWITCH INADVERTENTLY OPENS/SHORTS (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) MANIFOLD 5, L/R OX & FU ISOL VLV SWITCH

6)

7)

8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/1R	RTLS:	3/1R	
LIFTOFF:	3/1R	TAL:	3/1R	
ONORBIT:	3/1R	AOA:	3/1R	
DEORBIT:	3/1R	ATO:	3/1R	
LANDING/SAFING:	3/1R			

LANDING/SAFING: 3/IR

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: PNL 07 S26; S31 PART NUMBER: 33V73A7 S26; S31

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

INADVERTENTLY OPENING THE ISOLATION VALVE PREVENTS ISOLATION OF A THURSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12007 ABORT: 3/1R

ITEM: MANIFOLD #5, L/R OX & FU ISOL VLV SWITCH FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) MANIFOLD 5, L/R OX & FU ISOL VLV SWITCH

6)

7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	: 3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S26; S31 PART NUMBER: 33V73A7 S26; S31

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

SWITCH SHORT TO CASE WILL BLOW 1 AMP FUSE. LOSE CAPABILITY TO CLOSE ISOLATION VALVE. INABILITY TO CLOSE ISOLATION VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12008 ABORT: 3/2R

ITEM: RESISTOR, 1.2K 2W

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) RESISTOR, 1.2K 2W
- 6)
- 7) 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	3/3	
LIFTOFF:	3/3	TAL:	3/3	
ONORBIT:	3/2R	AOA:	3/3	
DEORBIT:	3/3	ATO:	3/2R	
LANDING/SAFING:	3/3			

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 56V76A123R J8-66, 67; J4-22, 21

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO MONITOR ISOLATION VALVE OPEN AND CLOSE STATUS. MANIFOLD STATUS (MDM FA1; MDM FA2) PROVIDES LATEST MICROSWITCH DISCRETE INFORMATION OF THE VALVES. VRCS MAY NOT BE USED IF VALVES THOUGHT TO BE CLOSED (LOSS OF MISSION). ALSO LOSE INHIBITS TO THE TYPE III "OPEN" AND "CLOSE" HYBRID DRIVERS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 3/3 MDAC ID: 12009 ABORT:

ITEM: RESISTOR, 1.2K 2W

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) RESISTOR, 1.2K 2W

6)

7)

8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		-

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

AV BAY 6, LCA 3 LOCATION:

PART NUMBER: 56V76A123R J8-66, 67; J4-22, 21

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12010 ABORT: 3/3

ITEM: RESISTOR, 5.1K 1/4W

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) RESISTOR, 5.1K 1/4W

6)

7)

8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	3/3	
LIFTOFF:	3/3	TAL:	3/3	
ONORBIT:	3/3	AOA:	3/3	
DEORBIT:	3/3	ATO:	3/3	
LANDING/SAFING:	3/3		•	

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3

PART NUMBER: 56V76A133R J7-6; J7-7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE CAPABILITY TO MONITOR RPC 15; RPC 10 WITH MDM

OA3. DATA NOT MISSION CRITICAL.

DATE: 10/01/87 SUBSYSTEM: ARCS HIGHEST CRITICALITY HDW/FUNC

FLIGHT: 3/3 ABORT: 3/3 MDAC ID: 12011

RESISTOR, 5.1K 1/4W ITEM:

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) RESISTOR, 5.1K 1/4W
- 6)
- 7) 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3

PART NUMBER: 56V76A133R J7-3; J7-7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

NO EFFECT. LOSE CAPABILITY TO MONITOR RPC 14; RPC 12 WITH MDM OA1. DATA NOT MISSION CRITICAL.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12012 ABORT: 3/2R

ITEM: RESISTOR, 5.1K 1/4W

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) RESISTOR, 5.1K 1/4W

6)

7)

8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		-

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 56V76A123R J2-45, J2-20

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE FUEL CLOSED DISCRETE INPUT TO THE MANIFOLD STATUS MONITOR (MDM FA1, FA2). MANIFOLD STATUS MONITOR MAY ISSUE A DILEMMA STATE AND SET THE MANIFOL STATUS TO CLOSED. KEYBOARD ENTRIES ARE REQUIRED TO OVERRIDE THE VALVE STATUS TO OPEN. TALKBACK INDICATOR PROVIDES REDUNDANCY. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF VRCS (MISSION) IF VALVES THOUGHT TO BE CLOSED.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12013 ABORT: 3/2R

ITEM: RESISTOR, 5.1K 1/4W

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) RESISTOR, 5.1K 1/4W

6)

7)

8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 56V76A123R J2-40, J2-22

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE OXIDIZER OPEN DISCRETE INPUT TO THE MANIFOLD STATUS MONITOR (MDM FA1, FA2). MANIFOLD STATUS MONITOR MAY ISSUE A DILEMMA STATE AND SET THE MANIFOL STATUS TO CLOSED. KEYBOARD ENTRIES ARE REQUIRED TO OVERRIDE THE VALVE STATUS TO OPEN. TALKBACK INDICATOR PROVIDES REDUNDANCY. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF VRCS (MISSION) IF VALVES THOUGHT TO BE CLOSED.

REFERENCES: ECN 102-8023A

REPORT DATE: 2/26/88 E-276

10/01/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS

FLIGHT: 3/2R

MDAC ID:

12014

ABORT:

3/2R

ITEM:

RESISTOR, 5.1K 1/4W

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS

5) RESISTOR, 5.1K 1/4W

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING	3/3		·

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LANDING/SAFING: 3/3

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 56V76A123R J2-41, J2-23

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE FUEL OPEN DISCRETE INPUT TO THE MANIFOLD STATUS MONITOR (MDM FA1, FA2). MANIFOLD STATUS MONITOR MAY ISSUE A DILEMMA STATE AND SET THE MANIFOL STATUS TO CLOSED. KEYBOARD ENTRIES ARE REQUIRED TO OVERRIDE THE VALVE STATUS TO OPEN. TALKBACK INDICATOR PROVIDES REDUNDANCY. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF VRCS (MISSION) IF VALVES THOUGHT TO BE CLOSED.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12015 ABORT: 3/2R

ITEM: RESISTOR, 5.1K 1/4W

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) RESISTOR, 5.1K 1/4W

6)

7)

8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING	: 3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 56V76A123R J2-46, J2-21

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE OXIDIZER CLOSE DISCRETE INPUT TO THE MANIFOLD STATUS MONITOR (MDM FA1, FA2). MANIFOLD STATUS MONITOR MAY ISSUE A DILEMMA STATE AND SET THE MANIFOL STATUS TO CLOSED. KEYBOARD ENTRIES ARE REQUIRED TO OVERRIDE THE VALVE STATUS TO OPEN. TALKBACK INDICATOR PROVIDES REDUNDANCY. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF VRCS (MISSION) IF VALVES THOUGHT TO BE CLOSED.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12016 ABORT: 3/2R

ITEM: EVENT INDICATOR

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS

5) EVENT INDICATOR

6)

7) 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	3/3	
LIFTOFF:	3/3	TAL:	3/3	
ONORBIT:	3/2R	AOA:	3/3	
DEORBIT:	3/3	ATO:	3/2R	
LANDING/SAFING:	3/3			

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S26; S31
PART NUMBER: 33V73A7 DS17; DS22

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO VISUALLY MONITOR ISOLATION VALVE OPEN OR CLOSE STATUS. REDUNDANCY IS PROVIDED WITH THE MANIFOLD STATUS MONITOR (MDM FA1, FA3). LOSE OF THIS REDUNDANCY MAY CAUSE LOSS OF VRCS (MISSION) IF VALVES THOUGHT TO BE CLOSED.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12017 ABORT: 3/2R

ITEM: EVENT INDICATOR FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) EVENT INDICATOR
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		·

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S26; S31
PART NUMBER: 33V73A7 DS17; DS22

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO VISUALLY MONITOR THE ISOLATION OPEN OR CLOSE STATUS. REDUNDANCY IS PROVIDED WITH THE MANIFOLD STATUS MONITOR (MDM FA1, FA3). LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF VRCS (MISSION) IF VALVES THOUGHT TO BE CLOSED.

REFERENCES: ECN 102-8023A

REPORT DATE: 2/26/88

DATE:

10/01/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS

FLIGHT: 3/1R

MDAC ID:

12018

ABORT:

3/1R

ITEM:

CONTROLLER, REMOTE POWER

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- CONTROLS 2)
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) CONTROLLER, REMOTE POWER

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AV BAY 6, PCA 3

PART NUMBER: 56V76A133 RPC15, 10

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE ISOLATION VALVE. INABILITY TO CLOSE ISOLATION VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12019 ABORT: 3/3

ITEM: CONTROLLER, REMOTE POWER

FAILURE MODE: FAILS HIGH

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) CONTROLLER, REMOTE POWER
- 6)
- 7)
- 8) 9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3
PART NUMBER: 56V76A133 RPC15, 10

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE INHIBIT TO THE TYPE III "OPEN" HYBRID DRIVER.

DETECTABLE WITH MDM OA3.

DATE:

10/01/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS

FLIGHT: 2/2

MDAC ID: 12020

ABORT:

2/2

ITEM:

CONTROLLER, REMOTE POWER

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) CONTROLLER, REMOTE POWER

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING	3/3		•

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

AV BAY 6, PCA 3

PART NUMBER: 56V76A133 RPC14, 12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVE. INABILITY TO OPEN ISOLATION VALVE PREVENT VRCS OPERATION (LOSS OF MISSION).

DETECTABLE WITH MDM OA1.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12021 ABORT: 3/3

ITEM: CONTROLLER, REMOTE POWER

FAILURE MODE: FAILS HIGH

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) CONTROLLER, REMOTE POWER
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3
PART NUMBER: 56V76A133 RPC14, 12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE INHIBIT TO THE TYPE III "OPEN" HYBRID DRIVER.

DETECTABLE WITH MDM OA1.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12022 ABORT: 3/2R

ITEM: DRIVER, HYBRID FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DRIVER, HYBRID

6)

7)

8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		·

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 56V76A123R 176, 159 TYPE II

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE VISUAL INDICATION OF VALVE CLOSURE STATUS. ALSO LOSE INHIBIT TO THE TYPE III "CLOSE" HYBRID DRIVER. THE MANIFOLD STATUS MONITOR (MDM FA1, FA2) PROVIDES VALVE POSITION DATA. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF VRCS (MISSION) IF VALVES THOUGHT TO BE CLOSED. TYPE III "CLOSE" DRIVER REQUIRES OTHER INHIBITS TO DRIVE IT AND THE GROUND DRIVE MUST BE DRIVEN FOR UNEXPECTED VALVE OPEN OR CLOSE MOVEMENT.

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

FLIGHT: 3/1R SUBSYSTEM: ARCS ABORT: 3/1R MDAC ID: 12023

DRIVER, HYBRID ITEM: FAILURE MODE: FAILS HIGH

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- MANIFOLD 5, L/R OX & FU ISOL VLVS
- DRIVER, HYBRID 5)

6)

7)

8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	: 3/1R		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 56V76A123R 176, 159 TYPE II

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

WITH THE VALVE OPEN, TALKBACK WILL DISPLAY BARBERPOLE. VALVE STATUS CAN BE MONITORED WITH MDM FA1, FA2. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OR VRCS (MISSION) IF VALVES THOUGHT TO BE CLOSED. ALSO LOSE INHIBIT TO THE TYPE III "CLOSE" DRIVER SO THAT IT CANNOT BE TURNED ON. THIS PREVENTS CLOSURE OF THE VALVE MANUALLY OR WITH THE GPC, THUS PREVENTING ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS

FLIGHT: 3/2R

MDAC ID: 12024

ABORT:

3/2R

ITEM:

DRIVER, HYBRID

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DRIVER, HYBRID

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING	: 3/3		·

LANDING/SAFING:

AV BAY 6, LCA 3 PART NUMBER: 56V76A123R 177, 160 TYPE II

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

SHOCK, OVERLOAD

LOCATION:

## EFFECTS/RATIONALE:

LOSE VISUAL INDICATION OF VALVE OPEN STATUS. ALSO LOSE AN INHIBIT TO THE TYPE III "OPEN" DRIVER. THE MANIFOLD STATUS MONITOR (MDM FA1, FA2) PROVIDES VALVE POSITION DATA. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF VRCS (MISSION) IF VALVES THOUGHT TO BE CLOSED. TYPE III "OPEN" DRIVER REQUIRES OTHER INHIBITS TO DRIVE IT AND THE GROUND DRIVER MUST BE DRIVEN FOR UNEXPECTED VALVE OPEN OR CLOSE MOVEMENT.

REFERENCES: ECN 102-8023A

E-287 REPORT DATE: 2/26/88

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

SUBSYSTEM: ARCS FLIGHT: 2/2 MDAC ID: 12025 ABORT: 2/2

DRIVER, HYBRID ITEM: FAILURE MODE: FAILS HIGH

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DRIVER, HYBRID
- 6)
- 7)
- 8)

9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 56V76A123R 177, 160 TYPE II

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

WITH THE VALVE CLOSED, TALKBACK WILL DISPLAY BARBERPOLE. VALVE STATUS CAN BE MONITORED BY MDM FA1, FA2. ALSO LOSE AN INHIBIT TO THE TYPE III "OPEN" DRIVER SO THAT IT CANNOT BE TURNED ON, THUS NOT ALLOWING THE VALVE TO BE OPENED (LOSS OF MISSION).

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R SUBSYSTEM: ARCS 3/1R ABORT: MDAC ID: 12026

DRIVER, HYBRID ITEM:

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS 5) DRIVER, HYBRID

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	•		•

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 56V76A123R 178, 161 TYPE III

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE THE ISOLATION VALVE WHICH PREVENTS ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12027 ABORT: 3/3

ITEM: DRIVER, HYBRID FAILURE MODE: FAILS HIGH

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DRIVER, HYBRID
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		·

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 56V76A123R 178, 161 TYPE III

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE INHIBITS REQUIRED TO CLOSE THE ISOLATION VALVE. THE GROUND DRIVER MUST BE TURNED ON FOR VALVE MOVEMENT. IF VALVE IS ATTEMPTED TO BE OPENED, BOTH SOLENOIDS WILL CONDUCT (WITH PROPER GROUND DRIVER STIMULI). WITH BOTH SOLENOIDS ENERGIZED, THE VALVE WILL TRANSFER TO OR REMAIN OPEN. BY REMOVING "OPEN" COMMAND, VALVE WILL CLOSE WITH PROPER GROUND STIMULI.

REFERENCES: ECN 102-8023A

REPORT DATE: 2/26/88 E-290

4

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12028 ABORT: 3/1R

ITEM: DRIVER, HYBRID

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS

5) DRIVER, HYBRID

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		-

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 56V76A123R 180, 163 TYPE I

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE ISOLATION VALVE. ALSO LOSE AN INHIBIT TO OPEN THE ISOLATION VALVE. INABILITY, TO CLOSE ISOLATION VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 2/2 MDAC ID: 12029 ABORT: 2/2

ITEM: DRIVER, HYBRID FAILURE MODE: FAILS HIGH

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DRIVER, HYBRID

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING	G: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 56V76A123R 180, 163 TYPE I

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVE. ALSO LOSE AN INHIBIT TO TURN ON RPC 15, 10. INABILITY TO OPEN ISOLATION VALVE PREVENTS VRCS OPERATION (LOSS OF MISSION).

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87 FLIGHT: 2/2 ABORT: 2/2 SUBSYSTEM: ARCS

MDAC ID: 12030

DRIVER, HYBRID ITEM: FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DRIVER, HYBRID

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 56V76A123R 179, 162 TYPE I

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVE. INABILITY TO OPEN ISOLATION VALVE PREVENTS VRCS OPERATION (LOSS OF MISSION).

HIGHEST CRITICALITY HDW/FUNC

DATE: 10/01/87 SUBSYSTEM: ARCS FLIGHT: 3/3 ABORT: 3/3 MDAC ID: 12031

ITEM: DRIVER, HYBRID FAILURE MODE: FAILS HIGH

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS 5) DRIVER, HYBRID
- 6)
- 7) 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		-

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 56V76A123R 179, 162 TYPE I

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE INHIBIT TO TURN ON RPC 14, 12. OTHER INHIBITS

REQUIRED TO OPEN VALVE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 2/2 MDAC ID: 12032 ABORT: 2/2

ITEM: DRIVER, HYBRID

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DRIVER, HYBRID
- 6)
- 7)
- 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING:	3/3		* 

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3

PART NUMBER: 56V76A133R J8-Z, J8-M TYPE III

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVE. INABILITY TO OPEN THIS VALVE PREVENTS VRCS OPERATION (LOSS OF MISSION).

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12033 ABORT: 3/1R

ITEM: DRIVER, HYBRID FAILURE MODE: FAILS HIGH

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DRIVER, HYBRID
- 6)
- 7)
- 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		-

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, PCA 3

PART NUMBER: 56V76A133R J8-Z, J8-M TYPE III

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE ISOLATION VALVE (WITH BOTH SOLENOIDS ENERGIZED, VALVE WILL TRANSFER OR REMAIN OPEN). INABILITY TO CLOSE VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 2/2 MDAC ID: 12034 ABORT: 2/2

ITEM: DRIVER, HYBRID FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DRIVER, HYBRID
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3

PART NUMBER: 56V76A133R J2-L, J2-a TYPE IV

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVE. INABILITY TO OPEN ISOLATION VALVE PREVENTS VRCS OPERATION (LOSS OF MISSION). IF VALVE WAS OPEN, LOSE CAPABILITY TO CLOSE ISOLATION VALVE. INABILITY TO CLOSE ISOLATION VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12035 ABORT: 3/3

ITEM: DRIVER, HYBRID FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DRIVER, HYBRID
- 6)
- 7) 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	3: 3/3		-

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3

PART NUMBER: 56V76A133R J2-L, J2-a TYPE IV

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

NO EFFECT. LOSE INHIBIT FROM THE SWITCH AND GPC INHIBITS FROM MDM FA4 TO TURN THE DRIVER ON. MANUAL AND GPC COMMANDS FOR VALVE MOVEMENT STILL OPERATE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12036 ABORT: 3/3

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	3/3	
LIFTOFF:	3/3	TAL:	3/3	
ONORBIT:	3/3	AOA:	3/3	
DEORBIT:	3/3	ATO:	3/3	
LANDING/SAFING:	: 3/3			

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 07 S26; S31

PART NUMBER: 33V73A7 J4-50, J4-47

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/2R SUBSYSTEM: ARCS MDAC ID: 12037 ABORT: 3/2R

DIODE ITEM:

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- MANIFOLD 5, L/R OX & FU ISOL VLVS 4)
- DIODE 5)
- 6)
- 7)
- 8)
- 9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
- 1115 - 116 / 61 57116 .	2.12		•

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S26; S31 PART NUMBER: 33V73A7 J4-50, J4-47

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVE MANUALLY. GPC OPEN/CLOSE COMMANDS STILL OPERABLE. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF MISSION.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE: FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: ARCS MDAC ID: 12038 ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
  4) MANIFOLD 5, L/R OX & FU ISOL VLVS

5) DIODE

6)

7)

8) 9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 07 S26; S31

PART NUMBER: 33V73A7 J6-54, J6-23

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12039 ABORT: 3/2R

ITEM: DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## **BREAKDOWN HIERARCHY:**

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING	: 3/3		·

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S26; S31
PART NUMBER: 33V73A7 J6-54, J6-23

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVE MANUALLY. GPC OPEN/CLOSE COMMANDS STILL OPERABLE. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF MISSION.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12040 ABORT: 3/1R

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)

9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		·

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 56V76A123 J2-38, J2-19

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY CLOSE THE ISOLATION VALVE. ALSO LOSE INHIBIT TO OPEN THE ISOLATION VALVE. GPC COMMANDS FOR OPEN OR CLOSE OF VALVE STILL OPERABLE. LOSS OF ALL REDUNDANCY TO CLOSE VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

REFERENCES: ECN 102-8023A

REPORT DATE : 2/26/88 E-303

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 ABORT: 3/3 MDAC ID: 12041

ITEM: DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		-

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 56V76A123 J2-38, J2-19

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM MDM FA2, FA1 STIMULI. LOSE

MANUAL CLOSE INHIBIT TO TYPE III "CLOSE" DRIVER.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12042 ABORT: 3/1R

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	•		•

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 56V76A123 J2-44, J2-28

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE GPC CAPABILITY TO CLOSE THE ISOLATION VALVE. MANUAL COMMAND FOR OPEN/CLOSE STILL OPERABLE FROM SWITCH. LOSS OF REDUNDANCY TO CLOSE VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

SUBSYSTEM: ARCS FLIGHT: 3/3 12043 ABORT: 3/3 MDAC ID:

DIODE ITEM:

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- CONTROLS 2)
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- DIODE 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, LCA 3

PART NUMBER: 56V76A123 J2-44, J2-28

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM SWITCH STIMULI.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12044 ABORT: 3/2R

ITEM:

DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, PCA 3

PART NUMBER: 56V76A133 J2-D, J2-T

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVE WITH GPC. MANUAL OPEN/CLOSE COMMANDS STILL OPERABLE. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF MISSION.

HIGHEST CRITICALITY HDW/FUNC

DATE: 10/01/87 SUBSYSTEM: ARCS FLIGHT: 3/3 ABORT: 3/3 MDAC ID: 12045

ITEM: DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)

9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	3: 3/3		·

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3

PART NUMBER: 56V76A133 J2-D, J2-T

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM SWITCH STIMULI.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12046 ABORT: 3/2R

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	•		·

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, PCA 3

PART NUMBER: 56V76A133 J5-j, J5-V

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVE MANUALLY. GPC OPEN/CLOSE COMMAND TO MOVE VALVE STILL OPERABLE. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF MISSION.

HIGHEST CRITICALITY HDW/FUNC

DATE: 10/01/87 SUBSYSTEM: ARCS FLIGHT: 3/3 ABORT: 3/3 MDAC ID: 12047

ITEM: DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE

6)

7)

8 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3

PART NUMBER: 56V76A133 J5-j, J5-V

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM MDM FA1, FA2. LOSE EXCLUSIVE GPC OPEN INHIBIT FROM MDM FA3.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/2R ABORT: 3/2R SUBSYSTEM: ARCS MDAC ID: 12048

DIODE ITEM:

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS

MANIFOLD4)
5) DIODE 5, L/R OX & FU ISOL VLVS

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	: 3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, PCA 3

PART NUMBER: 56V76A133 J5-j, J5-V

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVE MANUALLY. GPC OPEN/CLOSED COMMANDS TO MOVE VALVE STILL OPERABLE. LOSS OF THIS

REDUNDANCY MAY CAUSE LOSS OF MISSION.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12049 ABORT: 3/3 ITEM: DIODE FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

# CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3

PART NUMBER: 56V76A133 J5-j, J5-V

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM MDM FA3 STIMULI. LOSE

EXCLUSIVE GPC OPEN INHIBIT FROM MDM FA1, FA2.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12050 ABORT: 3/2R

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, PCA 3
PART NUMBER: 56V76A133 J2-F,J2-V

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE GPC CAPABILITY TO OPEN ISOLATION VALVE MANUAL OPEN/CLOSE COMMANDS FROM SWITCH STILL OPERABLE. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF MISSION.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12051 ABORT: 3/3

DIODE ITEM:

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3

PART NUMBER: 56V76A133 J2-F, J2-V

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM SWITCH STIMULI.

HIGHEST CRITICALITY HDW/FUNC

DATE: 10/01/87 SUBSYSTEM: ARCS FLIGHT: 2/2 ABORT: 2/2 MDAC ID: 12052

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3

PART NUMBER: 56V76A133 J7-3, J7-7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVES EITHER MANUALLY OR WITH GPC (LOSS OF MISSION).

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12053 ABORT: 3/3

ITEM: DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFIN	<b>3:</b> 3/3		·

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3

PART NUMBER: 56V76A133 J7-3, J7-7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FOR MDM OA1 AND FROM RPC 14, 12.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12054 ABORT: 3/2R

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S26; S31
PART NUMBER: 33V73A7 J6-42, J6-1

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO MONITOR OPEN VALVE STATUS VISUALLY. MANIFOLD STATUS MONITOR (MDM FA1, FA2) ALSO PROVIDES VALVE STATUS. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF VRCS (MISSION) IF VALVES THOUGHT TO BE CLOSED.

REFERENCES: ECN 102-8023A

REPORT DATE: 2/26/88 E-317

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12055 ABORT: 3/3

ITEM: DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 07 S26; S31
PART NUMBER: 33V73A7 J6-42, J6-1

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FOR DRIVER OUTPUT.

REFERENCES: ECN 102-8023A

REPORT DATE : 2/26/88 E-318

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12056 ABORT: 3/2R

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

# CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		-

LANDING/SATING: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S26; S31
PART NUMBER: 33V73A7 J6-33, J6-2

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

LOSE CAPABILITY TO MONITOR CLOSE VALVE STATUS VISUALLY. MANIFOLD STATUS MONITOR (MDM FA1, FA2) ALSO PROVIDES VALVE STATUS. LOSS OF THIS REDUNDANCY MAY CAUSE LOSS OF VRCS (MISSION) IF VALVES THOUGHT TO BE CLOSED.

10/01/87 DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12057 ABORT: 3/3

ITEM: DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		-

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 07 S26; S31 PART NUMBER: 33V73A7 J6-33, J6-2

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FOR DRIVER OUTPUT.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R ABORT: 3/1R SUBSYSTEM: ARCS MDAC ID: 12058

DIODE ITEM:

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS

5) DIODE

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AV BAY 6, PCA 3
PART NUMBER: 56V76A133 J2-6, J2-W

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE ISOLATION VALVE MANUALLY. GPC OPEN/CLOSED COMMANDS STILL OPERABLE. LOSS OF REDUNDANCY TO CLOSE VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12059 ABORT: 3/3

ITEM: DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3

PART NUMBER: 56V76A133 J2-6, J2-W

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM MDM FA3 STIMULI. LOSE MANUAL

CONTROL INHIBIT.

REFERENCES: ECN 102-8023A

REPORT DATE: 2/26/88 E-322

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12060 ABORT: 3/1R

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODI
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	: 3/1R		·

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AV BAY 6, PCA 3

PART NUMBER: 56V76A133 J2-H, J7-X

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE ISOLATION VALVE WITH GPC. MANUAL OPEN/CLOSE COMMANDS FROM SWITCH STILL OPERABLE. LOSS OF REDUNDANCY TO CLOSE VALVE PREVENTS ISOLATION OF THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12061 ABORT: 3/3

ITEM: DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/3	RTLS:	3/3
3/3	TAL:	3/3
3/3	AOA:	3/3
3/3	ATO:	3/3
: 3/3		•
	3/3 3/3 3/3 3/3	3/3 RTLS: 3/3 TAL: 3/3 AOA: 3/3 ATO:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3

PART NUMBER: 56V76A133 J2-H, J7-X

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM SWITCH.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12062 ABORT: 3/1R

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, PCA 3

PART NUMBER: 56V76A133 J2-A, J2-P

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY INHIBIT THE DRIVER TO GROUND. GPC CAPABILITY TO INHIBIT GROUND DRIVER STILL OPERABLE. LOSS OF THIS REDUNDANCY TO CLOSE THE ISOLATION VALVE PREVENTS ISOLATION OF THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/3 SUBSYSTEM: ARCS 12063 3/3 MDAC ID: ABORT:

DIODE ITEM:

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	: 3/3		-

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

AV BAY 6, PCA 3 LOCATION:

PART NUMBER: 56V76A133 J2-A, J2-P

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM MDM FA4 STIMULI.

10/01/87 DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS

FLIGHT: 3/1R ABORT: 3/1R

MDAC ID: 12064

ITEM:

DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- DIODE 5)
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

V1(2 = 2			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, PCA 3 PART NUMBER: 56V76A133 J2-B, J2-R

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE THE GPC CLOSE INHIBIT TO THE GROUND DRIVER. MANUAL INHIBIT AND GPC OPEN INHIBIT STILL OPERABLE. LOSS OF REDUNDANCY TO CLOSE THE ISOLATION VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY RESULT IN LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 3/3

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12065 ABORT: 3/3

ITEM: DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	3/3	
LIFTOFF:	3/3	TAL:	3/3	
ONORBIT:	3/3	AOA:	3/3	
DEORBIT:	3/3	ATO:	3/3	
LANDING/SAFING	: 3/3		·	

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3

PART NUMBER: 56V76A133 J2-B, J2-R

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM SWITCH AND MDM FA4 "OPEN" STIMULI.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12066 ABORT: 3/2R

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		-

DANDING/ DATING: 5/5

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, PCA 3

PART NUMBER: 56V76A133 J2-C, J2-S

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE GPC OPEN INHIBIT TO THE GROUND DRIVER. MANUAL INHIBIT AND GPC CLOSE INHIBIT STILL OPERABLE. LOSS OF REDUNDANCY TO OPEN THE ISOLATION VALVE MAY CAUSE LOSS OF MISSION.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 12067 MDAC ID: ABORT: 3/3

ITEM: DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3

PART NUMBER: 56V76A133 J2-C, J2-S

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM SWITCH AND MDM FA4 "CLOSE"

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DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12068 ABORT: 3/1R

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS

5) DIODE

6)

7)

8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: MANIFOLD 5, OXIDIZER ISOLATION VALVE

PART NUMBER: 51V42LV258 J15-1 (BOTH DIODES), 52V42LV358 J15-1

(BOTH DIODES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSS OF ONE DIODE HAS NO EFFECT. LOSS OF SECOND DIODE (THE REDUNDANCY) PREVENTS FURTHER OXIDIZER VALVE MOVEMENT. IF VALVE IS CLOSED, VRCS IS NOT OPERABLE (LOSS OF MISSION). IF VALVE IS OPEN, INABILITY TO CLOSE VALVES PREVENTS ISOLATION OF THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12069 ABORT: 3/3

ITEM:

DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MANIFOLD 5, OXIDIZER ISOLATION VALVE

PART NUMBER: 51V42LV258 J15-1 (BOTH DIODES), 52V42LV358 J15-1

(BOTH DIODES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM ERRONEOUS STIMULI TO THE OXIDIZER SOLENOIDS.

E-332

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12070 ABORT: 3/1R

ITEM:

DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	•		·

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: MANIFOLD 5, FUEL ISOLATION VALVE

PART NUMBER: 51V42LV257 J40-1 (BOTH DIODES); 5242LV357 J40-1

(BOTH DIODES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSS OF ONE DIODE HAS NO EFFECT. LOSS OF SECOND DIODE, (THE REDUNDANCY) PREVENTS FURTHER VALVE MOVEMENT. IF VALVE IS CLOSED, VRCS IS NOT OPERABLE (LOSS OF MISSION). IF VALVE IS OPEN, INABILITY TO CLOSE VALVE PREVENTS ISOLATION OF THRUSTER LEAK. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 ABORT: MDAC ID: 12071 3/3

ITEM: DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- DIODE 5)
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: MANIFOLD 5, FUEL ISOLATION VALVE

PART NUMBER: 51V42LV257 J40-1 (BOTH DIODES); 5242LV357 J40-1

(BOTH DIODES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

NO EFFECT. PROVIDES ISOLATION FROM ERRONEOUS STIMULI TO THE FUEL SOLENOIDS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 2/2 MDAC ID: 12072 ABORT: 2/2

ITEM: CIRCUIT BREAKER

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) CIRCUIT BREAKER
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PANEL R15

PART NUMBER: 32V73A15 CB71, CB72

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO INHIBIT GROUND DRIVER MANUALLY. GPC COMMANDS STILL OPERABLE. LOSS OF THIS REDUNDANCY PREVENTS FURTHER VALVE MOVEMENT. IF VALVE IS CLOSED, VRCS IS NOT OPERABLE (LOSS OF MISSION). IF VALVE IS OPEN, INABILITY TO CLOSE VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. THIS, COUPLED WITH LOSS OF ALL HARDWARE REDUNDANCY, MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12073 ABORT: 3/3

ITEM: CIRCUIT BREAKER FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) CIRCUIT BREAKER
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PANEL R15

PART NUMBER: 32V73A15 CB71, CB72

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE CAPABILITY TO MANUALLY OPEN CIRCUIT BREAKER.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12074 ABORT: 3/2R

ITEM: SWITCH, SOLENOID TALKBACK FAILURE MODE: FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS

5) SWITCH, SOLENOID TALKBACK

6) 7)

8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	3/3	
LIFTOFF:	3/3	TAL:	3/3	
ONORBIT:	3/2R	AOA:	3/3	
DEORBIT:	3/3	ATO:	3/2R	
LANDING/SAFING:	3/3		-	

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: MANIFOLD 5, OX & FU ISOL VALVE

PART NUMBER: 51V42LV258, 257 J15-3, 9; 5242LV358, 357 J15-3, 9

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO MONITOR ISOLATION VALVE OPEN OR CLOSE STATUS. MANIFOLD STATUS (MDM FA1, FA2) PROVIDES LATEST MICROSWITCH DISCRETE INFORMATION OF THE VALVES LOCATION. VRCS MAY BE LOST IF VALVES ARE THOUGHT TO BE CLOSED (LOSS OF MISSION). ALSO LOSE INHIBITS TO THE TYPE III "OPEN" AND "CLOSE" HYBRID DRIVERS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12075 ABORT: 3/2R

ITEM: SWITCH, SOLENOID TALKBACK FAILURE MODE: FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) SWITCH, SOLENOID TALKBACK
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: MANIFOLD 5, OX & FU ISOL VALVE

PART NUMBER: 51V42LV258, 257 J15-3, 9; 5242LV358, 357 J15-3, 9

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO MONITOR VALVE OPEN OR CLOSE STATUS. VRCS MAY BE LOST IF VALVES ARE THOUGHT TO BE CLOSED (LOSS OF MISSION). ALSO LOSE INHIBITS TO THE TYPE III "OPEN" OR "CLOSE" HYBRID DRIVERS.

10/01/87 HIGHEST CRITICALITY HDW/FUNC DATE:

FLIGHT: 3/1R SUBSYSTEM: ARCS 3/1R MDAC ID: 12076 ABORT:

ITEM: L/R HE OX & FU ISOL VLV A OR B SWITCH

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- CONTROLS 2)
- 3) HE PRESS SUBSYSTEM
- L/R HE OX & FU ISOL VLV A OR B
- L/R HE OX & FU ISOL VLV A OR B SWITCH 10, 11; 13, 14 5)

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		-

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07

PART NUMBER: 33V73A7S10, S11; 33V73A7S13, S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE ISOLATION VALVE. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY PREVENTS ISOLATION OF THE HELIUM SYSTEM LEADING TO OVERPRESSURIZATION AND POSSIBLE RUPTURE OF PROPELLANT TANKS AND LINES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 2/1R MDAC ID: 12077 ABORT: 2/1R

ITEM: L/R HE OX & FU ISOL VLV A OR B SWITCH

FAILURE MODE: SWITCH SHORTS ACROSS CONTAT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) HE PRESS SUBSYSTEM
- 4) L/R HE OX & FU ISOL VLV A OR B
- 5) L/R HE OX & FU ISOL VLV A OR B SWITCH 10, 11; 13, 14
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	3/2R
LANDING/SAFING	: 3/3		,

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07

PART NUMBER: 33V73A7S10, S11; 33V73A7S13, S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

WITH THE VALVE CLOSED, A SHORT ACROSS CLOSE CONTACTS 5, 6 WILL PREVENT FURTHER VALVE MOVEMENT. LOSS OF HARDWARE REDUNDANCY PREVENTS RCS ACTIVITY WHICH MAY CAUSE INABILITY TO EXPEL PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

REFERENCES: ECN 102-8023A

REPORT DATE: 2/26/88 E-340

HIGHEST CRITICALITY HDW/FUNC

DATE: 10/01/87 SUBSYSTEM: ARCS FLIGHT: 2/1R ABORT: 2/1R MDAC ID: 12078

L/R HE OX & FU ISOL VLV A OR B SWITCH ITEM:

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

SUBSYS LEAD: C.D. PRUST LEAD ANALYST: D. HARTMAN

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) HE PRESS SUBSYSTEM
- 4) L/R HE OX & FU ISOL VLV A OR B
- 5) L/R HE OX & FU ISOL VLV A OR B SWITCH 10, 11; 13, 14

6)

7) 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	2/1R	
LIFTOFF:	3/1R	TAL:	2/1R	
ONORBIT:	3/2R	AOA:	2/1R	
DEORBIT:	2/1R	ATO:	3/2R	
LANDING/SAFING:	3/3			

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07

PART NUMBER: 33V73A7S10, S11; 33V73A7S13, S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

WITH THE VALVE CLOSED, A SHORT ACROSS CLOSE CONTACTS 5, 6 WILL PREVENT ANY FURTHER VALVE MOVEMENT. LOSS OF HARDWARE REDUNDANCY PREVENTS RCS ACTIVITY WHICH MAY LEAD TO INABILITY TO EXPEL PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

REFERENCES: ECN 102-8023A

REPORT DATE: 2/26/88 E-341

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12079 ABORT: 3/1R

ITEM: L/R HE OX & FU ISOL VLV A OR B SWITCH

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) HE PRESS SUBSYSTEM
- 4) L/R HE OX & FU ISOL VLV A OR B
- 5) L/R HE OX & FU ISOL VLV A OR B SWITCH 10, 11; 13, 14

6)

7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07

PART NUMBER: 33V73A7S10, S11; 33V73A7S13, S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

INADVERTENTLY LOSE CAPABILITY TO CLOSE ISOLATION VALVE. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY, PREVENTS ISOLATION OF THE HELIUM SYSTEM LEADING TO OVERPRESSURIZATION AND POSSIBLE RUPTURE OF PROPELLANT TANKS AND LINES.

DATE:

10/01/87

HIGHEST CRITICALITY HDW/FUNC

2/1R

SUBSYSTEM: ARCS

FLIGHT: 2/1R

12080 MDAC ID:

ABORT:

L/R HE OX & FU ISOL VLV A OR B SWITCH ITEM:

FAILURE MODE: SHORT TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) HE PRESS SUBSYSTEM
- 4) L/R HE OX & FU ISOL VLV A OR B
- 5) L/R HE OX & FU ISOL VLV A OR B SWITCH 10, 11; 13, 14
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	2/1R	ATO:	3/2R
LANDING/SAFING:	•		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION:

PNL 07

PART NUMBER: 33V73A7S10, S11; 33V73A7S13, S14

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

WITH THE VALVE CLOSED, POLE TO POLE SHORT WHICH SHORTS ACROSS CONTACTS 5, 6 WILL PREVENT FURTHER VALVE MOVEMENT. LOSS OF HARDWARE REDUNDANCY PREVENTS RCS ACTIVITY WHICH MAY CAUSE INABILITY TO EXPEL PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12081 ABORT: 3/1R

ITEM: L/R OX & FU TK ISOL VLV 1/2 SWITCH

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- L/R OX & FU TK ISOL VLV 1/2 4)
- L/R OX & FU TK ISOL VLV 1/2 SWITCH 16, 19 5)

6)

7)

8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

PNL 07 S16; PNL 07 S19 LOCATION:

PART NUMBER: 33V73A7S16; S19

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY CONTROL THE VALVE WITH THE SWITCH. REDUNDANCY IS PROVIDED BY THE GPC. LOSS OF THIS REDUNDANCY PREVENTS OPENING/CLOSING THE ISOLATION VALVE. FAILURE TO OPEN THE ISOLATION VALVE AND THE LOSS OF REDUNDANCY PREVENTS AFT RCS ACTIVITY WHICH MAY LEAD TO EXCEEDANCE OF LANDING WEIGHT CONSTRAINTS OR C.G. SAFETY MARGINS. FAILURE TO CLOSE THE VALVE PREVENTS ISOLATION OF A THRUSTER LEAK.

REFERENCES: VS70-943099 REV B EO B12, DC, CC

REPORT DATE: 2/26/88 E-344

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 2/2 MDAC ID: 12082 ABORT: 1/1

ITEM: L/R OX & FU TK ISOL VLV 1/2 SWITCH FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 1/2
- 5) L/R OX & FU TK ISOL VLV 1/2 SWITCH 16, 19

6) 7)

8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	2/2	AOA:	3/1R
DEORBIT:	3/1R	ATO:	2/2
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 07 S16; PNL 07 S19

PART NUMBER: 33V73A7S16; S19

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

SWITCH FAILED SHORT ACROSS OPEN CONTACTS CAUSES INABILITY TO CLOSE THE VALVE. THIS PREVENTS CROSSFEED OPERATION THUS LOSS OF MISSION OPERATIONS. INABILITY TO CROSSFEED MAY CAUSE INCOMPLETE OMS ABORT DUMP.

REFERENCES: VS70-943099 REV B EO B12, DC, CC

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 2/2 MDAC ID: 12083 ABORT: 1/1

ITEM: L/R OX & FU TK ISOL VLV 1/2 SWITCH

FAILURE MODE: SWITCH SHORTS ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 1/2
- 5) L/R OX & FU TK ISOL VLV 1/2 SWITCH 16, 19

6)

7)

8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	2/2	AOA:	3/1R
DEORBIT:	3/1R	ATO:	2/2
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 07 S16; PNL 07 S19

PART NUMBER: 33V73A7S16; S19

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

SWITCH FAILED SHORT ACROSS OPEN CONTACTS CAUSES INABILITY TO CLOSE THE VALVE. THIS PREVENTS CROSSFEED OPERATION THUS LOSS OF MISSION OPERATIONS. INABILITY TO CROSSFEED MAY CAUSE INCOMPLETE OMS ABORT DUMP.

REFERENCES: VS70-943099 REV B EO B12, DC, CC

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87 SUBSYSTEM: ARCS FLIGHT: 2/2 ABORT: 1/1 MDAC ID: 12084 L/R OX & FU TK ISOL VLV 1/2 SWITCH ITEM:

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 1/2
- 5) L/R OX & FU TK ISOL VLV 1/2 SWITCH 16, 19

6) 7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	2/2	AOA:	3/1R
DEORBIT:	3/1R	ATO:	2/2
LANDING/SAFING:			·

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 07 S16; PNL 07 S19

PART NUMBER: 33V73A7S16; S19

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

SWITCH INADVERTENTLY OPERATING CAUSES INABILITY TO CLOSE THE VALVE. THIS PREVENTS CROSSFEED OPERATION THUS LOSS OF MISSION. INABILITY TO CROSSFEED MAY CAUSE INCOMPLETE OMS ABORT DUMP.

REFERENCES: VS70-943099 REV B EO B12, DC, CC

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12085 ABORT: 3/1R

ITEM: L/R OX & FU TK ISOL VLV 1/2 SWITCH

FAILURE MODE: SHORT TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 1/2
- 5) L/R OX & FU TK ISOL VLV 1/2 SWITCH 16, 19

6) 7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		·

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S16; PNL 07 S19

PART NUMBER: 33V73A7S16; S19

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

WITH A SHORT TO CASE, CAPABILITY TO MANUALLY SWITCH THE VALVES IS LOST (BLOWN FUSE). REDUNDANCY IS PROVIDED WITH GPC COMMANDS. LOSS OF ALL REDUNDANCY PREVENTS CLOSING THE VALVE TO ISOLATE A THRUSTER LEAK WHICH MAY CAUSE LOSS OF CREW/VEHICLE.

REFERENCES: VS70-943099 REV B EO B12, DC, CC

REPORT DATE: 2/26/88 E-348

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12086 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (OPEN CIRCUIT)

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 1/2
- 5) DIODE LIMIT SWITCH (OPEN CIRCUIT)
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 J2-73, J2-39, J2-63, J2-49; J5-25, J5-9,

J5-27. J5-15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE TALKBACK LOGIC TO TURN MOTOR OFF. MOTOR CAN WITHSTAND CONTINUOUS POWER. VALVE MOVEMENT OPEN AND CLOSE STILL OPERABLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12087 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (OPEN CIRCUIT)

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 1/2
- 5) DIODE LIMIT SWITCH (OPEN CIRCUIT)

6) 7)

8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 J2-73, J2-39, J2-63, J2-49; J5-25, J5-9,

J5-27, J5-15

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

REFERENCES: VS70-943099 REV B EO B12; JSC 20923 PCN-1

REPORT DATE: 2/26/88

E-350

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12088 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (CLOSED CIRCUIT)

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 1/2
- 5) DIODE LIMIT SWITCH (CLOSED CIRCUIT)

6) 7)

8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	3/3	
LIFTOFF:	3/3	TAL:	3/3	
ONORBIT:	3/3	AOA:	3/3	
DEORBIT:	3/3	ATO:	3/3	
LANDING/SAFING:	3/3		•	

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 J2-74, J2-50; J5-26, J5-8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE TALKBACK LOGIC TO TURN MOTOR OFF. MOTOR CAN WITHSTAND CONTINUOUS POWER. VALVE MOVEMENT OPEN AND CLOSE STILL OPERABLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12089 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (CLOSED CIRCUIT)

FAILUREMODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 1/2
- 5) DIODE LIMIT SWITCH (CLOSED CIRCUIT)

6)

7) 8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 J2-74, J2-50; J5-26, J5-8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

REFERENCES: VS70-943099 REV B EO B12; JSC 20923 PCN-1

REPORT DATE: 2/26/88 E-352

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12090 ABORT: 1/1

ITEM: DIODE - GPC CLOSE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 1/2
- 5) DIODE GPC CLOSE
- 6)
- 7)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		•

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 J3-108, J2-16, J3-107; J3-38, J5-121, J3-

59

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE GPC COMMAND TO CLOSE THE VALVE. MANUAL COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY MAY CAUSE THE INABILITY TO ISOLATE A THRUSTER LEAK.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12091 ABORT: 3/3

ITEM: DIODE - GPC CLOSE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 1/2
- 5) DIODE GPC CLOSE

6)

7)

8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		·

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 J3-108, J2-16, J3-107; J3-38, J5-121, J3-

59

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12092 ABORT: 3/1R

ITEM: DIODE - GPC OPEN

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 1/2
- 5) DIODE GPC OPEN

6)

7)

8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:			<b>.</b>

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 J3-101, J2-26, J3-100; J3-128, J5-119,

J3-39

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE GPC COMMAND TO OPEN THE VALVE. MANUAL COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET TANK LANDING CONSTRAINTS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12093 ABORT: 3/3

ITEM: DIODE - GPC OPEN

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 1/2
- 5) DIODE GPC OPEN
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 J3-101, J2-26, J3-100; J3-128, J5-119,

J3-39

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12094 ABORT: 3/1R

ITEM: DIODE - MANUAL OPEN

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 1/2

5) DIODE - MANUAL OPEN

6)

7)

8) 9)

### CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/3	RTLS:	3/1R
3/1R	TAL:	3/1R
3/2R	AOA:	3/1R
3/1R	ATO:	3/2R
: 3/3		
	3/3 3/1R 3/2R 3/1R	3/3 RTLS: 3/1R TAL: 3/2R AOA: 3/1R ATO:

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 J2-60, J3-110; J5-49, J3-7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE MANUAL COMMAND TO OPEN THE VALVE. GPC COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANT TO MEET TANK LANDING CONTRAINTS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12095 ABORT: 3/3

ITEM: DIODE - MANUAL OPEN

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 1/2
- 5) DIODE MANUAL OPEN

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 J2-60, J3-110; J5-49, J3-7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

REFERENCES: VS70-943099 REV B EO B12; JSC 20923 PCN-1

REPORT DATE: 2/26/88 E-358

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12096 ABORT: 3/1R

ITEM: DIODE - MANUAL CLOSE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 1/2
- 5) DIODE MANUAL CLOSE
- 6)
- 7) 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	•		•

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 J2-48, J3-111; J5-19, J3-1

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE MANUAL COMMAND TO CLOSE THE VALVE. GPC COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY MAY CAUSE THE INABILITY TO ISOLATE A THRUSTER LEAK.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12097 ABORT: 3/3

ITEM: DIODE - MANUAL CLOSE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 1/2
- 5) DIODE MANUAL CLOSE
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		•

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 J2-48, J3-111; J5-19, J3-1

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

REFERENCES: VS70-943099 REV B EO B12; JSC 20923 PCN-1

REPORT DATE: 2/26/88 E-360

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 3/3

MDAC ID: 12098 ABORT: 3/3

ITEM: DIODE - MANUAL OPEN/CLOSE INHIBIT

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 1/2
- 5) DIODE MANUAL OPEN/CLOSE INHIBIT

6)

7) 8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 J2-60, J3-110; J5-49, J3-7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE "POWER OFF" INHIBIT TO THE CLOSE RELAYS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 2/2 MDAC ID: 12099 ABORT: 1/1

ITEM: DIODE - MANUAL OPEN/CLOSE INHIBIT

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 1/2
- 5) DIODE MANUAL OPEN/CLOSE INHIBIT

6)

7)

8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	2/2	AOA:	2/2
DEORBIT:	3/1R	ATO:	2/2
LANDING/SAFING:	3/3		·

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 J2-60, J3-110; J5-49, J3-7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE THE VALVE (OPEN RELAY HAS CONSTANT INHIBIT). THIS PREVENTS CROSSFEED OPERATION THUS LOSS OF MISSION. INABILITY TO CROSSFEED MAY CAUSE INCOMPLETE OMS ABORT DUMP.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12100 ABORT: 3/3

ITEM: DIODE - MANUAL CLOSE/OPEN INHIBIT

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 1/2
- 5) DIODE MANUAL CLOSE/OPEN INHIBIT

6)

7)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		·

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 J3-111, J2-48; J3-1, J5-19

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE "POWER OFF" INHIBIT TO OPEN THE RELAY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12101 ABORT: 3/3

ITEM: DIODE - MANUAL CLOSE/OPEN INHIBIT

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 1/2
- 5) DIOE MANUAL CLOSE/OPEN INHIBIT

6) 7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 J3-111, J2-48; J3-1, J5-19

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

REFERENCES: VS70-943099 REV B EO B12; JSC 20923 PCN-1

REPORT DATE : 2/26/88 E-364

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12102 ABORT: 3/1R

ITEM: L/R OX & FU TK ISOL VLV 3/4/5 A OR B SWITCH

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 3/4/5 A OR B
- 5) L/R OX & FU TK ISOL VLV 3/4/5 A OR B SWITCH 17, 18; 20, 21

6) 7)

8)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	3/1R		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S17, S18; PNL 07 S20, S21 PART NUMBER: 33V73A7S17, S18; 33V73A7S20; S21

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY CONTROL THE VALVE WITH THE SWITCH. REDUNDANCY IS PROVIDED BY THE GPC. LOSS OF THIS REDUNDANCY PREVENTS OPENING/CLOSING THE ISOLATION VALVE. FAILURE TO RE-OPEN THE ISOLATION VALVE AND THE LOSS OF REDUNDANCY PREVENTS AFT RCS ACTIVITY WHICH MAY LEAD TO EXCEEDNCE OF LANDING WEIGHT CONSTRAINTS. FAILURE TO CLOSE THE VALVE PREVENTS ISOLATION OF A THRUSTER LEAK.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 2/2 MDAC ID: 12103 ABORT: 1/1

ITEM: L/R OX & FU TK ISOL VLV 3/4/5 A OR B SWITCH

FAILURE MODE: SWITCH FAILS WORST (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 3/4/5 A OR B
- 5) L/R OX & FU TK ISOL VLV 3/4/5 A OR B SWITCH 17, 18; 20, 21
- 6) 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	2/2	AOA:	3/1R
DEORBIT:	3/1R	ATO:	2/2
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 07 S17, S18; PNL 07 S20, S21 PART NUMBER: 33V73A7S17, S18; 33V73A7S20; S21

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

SWITCH FAILED SHORT ACROSS OPEN CONTACTS CAUSES INABILITY TO CLOSE THE VALVE. THIS PREVENTS CROSSFEED OPERATION THUS LOSS OF MISSION. INABILITY TO CROSSFEED MAY CAUSE INCOMPLETE OMS ABORT DUMP.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 2/2 MDAC ID: 12104 ABORT: 1/1

ITEM: L/R OX & FU TK ISOL VLV 3/4/5 A OR B SWITCH FAILURE MODE: SWITCH SHORTS ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 3/4/5 A OR B
- 5) L/R OX & FU TK ISOL VLV 3/4/5 A OR B SWITCH 17, 18; 20, 21

6) 7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	1/1	
LIFTOFF:	3/1R	TAL:	1/1	
ONORBIT:	2/2	AOA:	3/1R	
DEORBIT:	3/1R	ATO:	2/2	
LANDING/SAFING	: 3/3		•	

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 07 S17, S18; PNL 07 S20, S21 PART NUMBER: 33V73A7S17, S18; 33V73A7S20; S21

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

SWITCH FAILED SHORT ACROSS OPEN CONTACTS CAUSES INABILITY TO CLOSE THE VALVE. THIS PREVENTS CROSSFEED OPERATION THUS LOSS OF MISSION. INABILITY TO CROSSFEED MAY CAUSE INCOMPLETE OMS ABORT DUMP.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 2/2 MDAC ID: 12105 ABORT: 1/1

L/R OX & FU TK ISOL VLV 3/4/5 A OR B SWITCH ITEM: FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 3/4/5 A OR B
- 5) L/R OX & FU TK ISOL VLV 3/4/5 A OR B SWITCH 17, 18; 20, 21
- 6) 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	2/2	AOA:	3/1R
DEORBIT:	3/1R	ATO:	2/2
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 07 S17, S18; PNL 07 S20, S21 PART NUMBER: 33V73A7S17, S18; 33V73A7S20; S21

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

SWITCH INADVERTENTLY OPERATING ACROSS OPEN CONTACTS CAUSES INABILITY TO CLOSE THE VALVE. THIS PREVENTS CROSSFEED OPERATION THUS LOSS OF MISSION. INABILITY TO CROSSFEED MAY CAUSE INCOMPLETE OMS ABORT DUMP.

10/01/87 DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS

FLIGHT: 3/1R

MDAC ID: 12106

ABORT:

3/1R

ITEM:

L/R OX & FU TK ISOL VLV 3/4/5 A OR B SWITCH FAILURE MODE: SHORT TO CASE OF POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- CONTROLS 2)
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 3/4/5 A OR B

5) L/R OX & FU TK ISOL VLV 3/4/5 A OR B SWITCH 17, 18; 20, 21

6)

7) 8)

9)

#### CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/1R	RTLS:	3/1R
•	TAL:	3/1R
•	AOA:	3/1R
3/1R	ATO:	3/1R
: 3/1R		
	3/1R 3/1R 3/1R 3/1R	3/1R RTLS: 3/1R TAL: 3/1R AOA: 3/1R ATO:

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S17, S18; PNL 07 S20, S21 PART NUMBER: 33V73A7S17, S18; 33V73A7S20; S21

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

WITH A SHORT TO CASE, CAPABILITY TO MANUALLY SWITCH THE VALVE IS LOST (BLOWN FUSE). REDUNDANCY IS PROVIDED WITH GPC COMMANDS. LOSS OF ALL REDUNDANCY PREVENTS CLOSING THE VALVE TO ISOLATE A THRUSTER LEAK WHICH MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12107 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (OPEN CIRCUIT)

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 3/4/5 A OR B
- 5) DIODE LIMIT SWITCH (OPEN CIRCUIT)

6) 7)

8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		,

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA 1

PART NUMBER: J2-48, J2-69 - J2-87, J2-74; J2-36, J2-17 - J1-50,

**J1-60** 

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE TALKBACK LOGIC TO TURN MOTOR OFF. MOTOR CAN WITHSTAND CONTINUOUS POWER. VALVE MOVEMENT OPEN AND CLOSE STILL OPERABLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12108 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (OPEN CIRCUIT)
FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 3/4/5 A OR B
- 5) DIODE LIMIT SWITCH (OPEN CIRCUIT)
- 6) 7)
- 8)
- 9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA 1

PART NUMBER: J2-48, J2-69 - J2-87, J2-74; J2-36, J2-17 - J1-50,

J1-60

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12109 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (CLOSE CIRCUIT)

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 3/4/5 A OR B
- DIODE LIMIT SWITCH (CLOSE CIRCUIT) 5)
- 6)
- 7)
- 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA 1

PART NUMBER: 33V73A7A2CR28, A1CR35; J2-34, J1-17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE TALKABACK LOGIC TO TURN MOTOR OFF. MOTOR CAN WITHSTAND CONTINUOUS POWER. VALVE MOVEMENT OPEN AND CLOSE STILL OPERABLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12110 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (CLOSE CIRCUIT)

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 3/4/5 A OR B
- 5) DIODE LIMIT SWITCH (CLOSE CIRCUIT)

6)

7)

8) 9)

#### CRITICALITIES

V1/2 # 1 V1-11-1			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA 1

PART NUMBER: 33V73A7A2CR28, A1CR35; J2-34, J1-17

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12111 ABORT: 1/1

ITEM: DIODE - GPC CLOSE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 3/4/5 A OR B
- 5) DIODE GPC CLOSE
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING.	3/1D		•

LANDING/SAFING: 3/1R

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AFT MCA 1

PART NUMBER: J2-89, J2-87 - J2-78, J2-77; J2-56, J2-16 - J1-39,

J1-37

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE GPC COMMAND TO CLOSE THE VALVE. MANUAL COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY MAY CAUSE THE INABILITY TO ISOLATE A THRUSTER LEAK.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12112 ABORT: 3/3

ITEM: DIODE - GPC CLOSE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 3/4/5 A OR B
- 5) DIODE GPC CLOSE
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA 1

PART NUMBER: J2-89, J2-87 - J2-78, J2-77; J2-56, J2-16 - J1-39,

J1-37

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12113 ABORT: 3/1R

ITEM: DIODE - GPC OPEN

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 3/4/5 A OR B

5) DIODE - GPC OPEN

6)

7)

8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	: 3/1R		-

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AFT MCA 1

PART NUMBER: J2-90, J2-88 - J2-80, J2-79; J2-67, J2-25 - J1-41,

J1-40

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE GPC COMMAND TO OPEN THE VALVE. MANUAL COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET TANK LANDING WEIGHT CONSTRAINTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE: 2/26/88 E-376

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

FLIGHT: 3/3 SUBSYSTEM: ARCS 3/3 ABORT: MDAC ID: 12114

DIODE - GPC OPEN ITEM:

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 3/4/5 A OR B
  5) DIODE GPC OPEN
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA 1

PART NUMBER: J2-90, J2-88 - J2-80, J2-79; J2-67, J2-25 - J1-41,

J1-40

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12115 ABORT: 3/1R

ITEM: DIODE - MANUAL OPEN

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 3/4/5 A OR B
- 5) DIODE MANUAL OPEN

6)

7)

8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		·

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AFT MCA 1

PART NUMBER: J2-23, J2-106; J2-7, J1-30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE MANUAL COMMAND TO OPEN THE VALVE. GPC COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET TANK LANDING WEIGHT CONSTRAINTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE: 2/26/88 E-378

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12116 ABORT: 3/3

ITEM: DIODE - MANUAL OPEN

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 3/4/5 A OR B
- 5) DIODE MANUAL OPEN
- 6)
- 7) 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		·

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA 1

PART NUMBER: J2-23, J2-106; J2-7, J1-30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE

SYSTEMS HANDBOOK

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12117 ABORT: 3/1R

ITEM: DIODE - MANUAL CLOSE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 3/4/5 A OR B
- 5) DIODE MANUAL CLOSE
- 6)
- 7)
- 8)

9)

#### CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/1R	RTLS:	3/1R
3/1R	TAL:	3/1R
3/1R	AOA:	3/1R
3/1R	ATO:	3/1R
3/1R		-
	3/1R 3/1R 3/1R 3/1R	3/1R RTLS: 3/1R TAL: 3/1R AOA: 3/1R ATO:

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AFT MCA 1

PART NUMBER: J2-21, J2-96; J2-15, J1-29

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE MANUAL COMMAND TO CLOSE THE VALVE. GPC COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY MAY CAUSE THE INABILITY TO ISOLATE A THRUSTER LEAK.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE : 2/26/88 E-380

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12118 ABORT: 3/3

ITEM: DIODE - MANUAL CLOSE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 3/4/5 A OR B
- 5) DIODE MANUAL CLOSE
- 6)
- 7)
- 8) 9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA 1

PART NUMBER: J2-21, J2-96; J2-15, J1-29

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE

SYSTEMS HANDBOOK

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12119 ABORT: 3/3

ITEM: DIODE - MANUAL OPEN/CLOSE INHIBIT

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- PROP STOR & DIST SUBSYSTEM 3)
- 4) L/R OX & FU TK ISOL VLV 3/4/5 A OR B
- 5) DIODE - MANUAL OPEN/CLOSE INHIBIT
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		,

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA 1

PART NUMBER: J2-23, J2-106; J2-7, J1-30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE "POWER OFF" INHIBIT TO THE CLOSE RELAYS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE: 2/26/88

E-382

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87 FLIGHT: 2/2 ABORT: 1/1 SUBSYSTEM: ARCS

MDAC ID: 12120

DIODE - MANUAL OPEN/CLOSE INHIBIT ITEM:

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 3/4/5 A OR B
- 5) DIODE MANUAL OPEN/CLOSE INHIBIT

6)

7)

8) 9)

### CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/3	RTLS:	1/1
3/1R	TAL:	1/1
2/2	AOA:	2/1R
3/1R	ATO:	3/1R
: 3/3		
	3/1R 2/2 3/1R	3/3 RTLS: 3/1R TAL: 2/2 AOA: 3/1R ATO:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA 1

PART NUMBER: J2-23, J2-106; J2-7, J1-30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE THE VALVE (OPEN RELAY HAS CONSTANT INHIBIT). THIS PREVENTS CROSSFEED OPERATION THUS LOSS OF MISSION. INABILITY TO CROSSFEED MAY CAUSE INCOMPLETE OMS ABORT DUMP.

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12121 ABORT: 3/3

ITEM: DIODE - MANUAL CLOSE/OPEN INHIBIT

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 3/4/5 A OR B
- 5) DIODE MANUAL CLOSE/OPEN INHIBIT

6)

7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	3: 3/3		ŕ

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA 1

PART NUMBER: J2-21, J2-106; J2-15, J1-30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

NO EFFECT. LOSE "POWER OFF" INHIBIT TO OPEN THE RELAY.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE

SYSTEMS HANDBOOK

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12122 ABORT: 2/1R

ITEM: DIODE - MANUAL CLOSE/OPEN INHIBIT

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 3/4/5 A OR B

5) DIODE - MANUAL CLOSE/OPEN INHIBIT

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/1R	ATO:	3/3
LANDING/SAFING:	: 3 <sup>'</sup> /3		

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AFT MCA 1

PART NUMBER: J2-21, J2-106; J2-15, J1-30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

IF THE VALVE WAS OPENED WITH THE GPC, LOSE INHIBIT TO CLOSE THE VALVE. OTHER LEG AVAILABLE. LOSS OF ALL REDUNDANCY PREVENTS AFT RCS ACTIVITY WHICH MAY LEAD TO EXCEEDANCE OF LANDING CONSTRAINTS AND/OR C.G. SAFETY MARGINS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12123 ABORT: 3/2R

ITEM: DIODE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 3/4/5 A OR B
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 DS1; DS4

PART NUMBER: 33V73A7A2CR5, A2CR6; 33V73A7A3CR5, A3CR6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

REDUNDANCY IS PROVIDED WITH THE GPCs. LOSS OF THIS REDUNDANCY MAY LEAD TO FALSELY FAILING THE VALVE CLOSED WHICH COULD PREVENT SOME MISSION OBJECTIVES.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE: 2/26/88 E-386

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/3 SUBSYSTEM: ARCS 3/3 ABORT: MDAC ID: 12124

ITEM:

DIODE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU TK ISOL VLV 3/4/5 A OR B

5) DIODE

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 07 DS1; DS4

PART NUMBER: 33V73A7A2CR5, A2CR6; 33V73A7A3CR5, A3CR6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. TALKBACK IS STILL AVAILABLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12125 ABORT: 2/1R

ITEM: L/R OX & FU CROSSFEED VLV 1/2 SWITCH 32, 34

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 1/2
- L/R OX & FU CROSSFEED VLV 1/2 SWITCH 32, 34

6) 7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		•

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: PNL 07 S32; PNL 07 S34

PART NUMBER: 33V73A7S32; S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUAL SWITCH THE VALVES OPEN OR CLOSE. REDUNDANCY TO OPEN OR CLOSE THE VALVE IS PROVIDED WITH THE GPCs. LOSS OF ALL REDUNDANCY MAY PREVENT ISOLATION OF A THRUSTER LEAK.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 2/2 SUBSYSTEM: ARCS ABORT: 1/1 MDAC ID: 12126

L/R OX & FU CROSSFEED VLV 1/2 SWITCH 32, 34 ITEM:

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 1/2
- 5) L/R OX & FU CROSSFEED VLV 1/2 SWITCH 32, 34

6)

7) 8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	2/2	AOA:	3/1R
DEORBIT:	3/1R	ATO:	2/2
LANDING/SAFING:	: 3/1R		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 07 S32; PNL 07 S34

PART NUMBER: 33V73A7S32; S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUAL SWITCH THE VALVES OPEN OR CLOSE ONCE IT SHORTS. NO REDUNDANCY IS AVAILABLE. INABILITY TO SWITCH THE VALVE CLOSED MAY EFFECT MISSION OBJECTIVES. INABILITY TO SWITCH VALVE OPEN DURING RTLS/TAL PREVENTS PROPELLANTS TO BE EXPELLED.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 2/2 MDAC ID: 12127 ABORT: 1/1

ITEM: L/R OX & FU CROSSFEED VLV 1/2 SWITCH 32, 34
FAILURE MODE: SWITCH SHORTS ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 1/2
- 5) L/R OX & FU CROSSFEED VLV 1/2 SWITCH 32, 34

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	2/2	AOA:	3/1R
DEORBIT:	3/1R	ATO:	2/2
LANDING/SAFING:	3/1R		- <b>/ -</b>

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 07 S32; PNL 07 S34

PART NUMBER: 33V73A7S32; S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

A SHORT ACROSS EITHER CLOSE CONTACT SET (11, 12 OR 5, 6) WILL PREVENT THE VALVE FROM BEING OPENED. INABILITY TO OPEN THE CROSSFEED VALVE MAY EFFECT MISSION OBJECTIVES. INABILITY TO OPEN VALVE DURING RTLS/TAL PREVENTS PROPELLANTS TO BE EXPELLED.

REFERENCES: VS70-943099 REV B EO B12, DD, CD

REPORT DATE: 2/26/88 E-390

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12128 ABORT: 3/1R

ITEM: L/R OX & FU CROSSFEED VLV 1/2 SWITCH 32, 34

FAILURE MODE: SWITCH INADVERTENTLY FAILS OPEN/SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 1/2
- 5) L/R OX & FU CROSSFEED VLV 1/2 SWITCH 32, 34

6)

7) 8)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	: 3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S32; PNL 07 S34

PART NUMBER: 33V73A7S32; S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

IF VALVE IS CLOSED TO ISOLATE A THRUSTER LEAK, INADVERTENTLY

OPENING THE VALVE PREVENTS ISOLATION OF THIS LEAK.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12129 ABORT: 2/1R

ITEM: L/R OX & FU CROSSFEED VLV 1/2 SWITCH 32, 34

FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 1/2
- 5) L/R OX & FU CROSSFEED VLV 1/2 SWITCH 32, 34

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	: 3/1R		·

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S32; PNL 07 S34

PART NUMBER: 33V73A7S32; S34

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

A SHORT TO CASE WILL BLOW THE 1 AMP FUSE THUS PREVENTING MANUAL SWITCHING OF VALVES. GPC COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY MAY PREVENT ISOLATION OF A THRUSTER LEAK.

REFERENCES: VS70-943099 REV B EO B12, DD, CD

**REPORT DATE : 2/26/88** E-392

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12130 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (OPEN CIRCUIT)

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 1/2
- 5) DIODE LIMIT SWITCH (OPEN CIRCUIT)

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 - J2-86, J2-66, J2-53, J2-76; J5-42, J5-79, J5-89, J5-76

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE LOGIC TALKBACK TO TURN OFF MOTOR WHEN MOTOR WAS TURNED ON
MANUALLY TO OPEN THE VALVE. MOTOR CAN WITHSTAND CONTINUOUS
POWER. MOTOR TURNS OFF WHEN VALVE IS COMMANDED CLOSED. THUS, NO
EFFECT TO OPERATION.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12131 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (OPEN CIRCUIT)

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 1/2
- 5) DIODE LIMIT SWITCH (OPEN CIRCUIT)

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 - J2-86, J2-66, J2-53, J2-76; J5-42, J5-

79, J5-89, J5-76

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12132 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (CLOSED CIRCUIT)

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 1/2
- 5) DIODE LIMIT SWITCH (CLOSED CIRCUIT)

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 - J2-87, J2-77; J5-43, J5-77

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE LOGIC TALKBACK TO UNLATCH THE RELAY WHEN MOTOR WAS TURNED ON MANUALLY TO CLOSE THE VALVE. REDUNDANCY TO TURN MOTOR OFF IS PROVIDED WITH ANOTHER DIODE TO UNLATCH THE RELAY. LOSS OF ALL REDUNDANCY CAUSES INABILITY TO TURN MOTOR OFF. MOTOR CAN WITHSTAND CONTINUOUS POWER. THUS, NO EFFECT TO OPERATION.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12133 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (CLOSED CIRCUIT)

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 1/2
- 5) DIODE LIMIT SWITCH (CLOSED CIRCUIT)

6)

7) 8)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 - J2-87, J2-77; J5-43, J5-77

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

ALLOWS ONE CONTACT SET ON THE SWITCH TO DISCONTINUE POWER TO BOTH "CLOSE" RELAYS. NO EFFECT ON OPERATION.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R ABORT: 3/1R SUBSYSTEM: ARCS MDAC ID: 12134

DIODE - GPC CLOSE ITEM:

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 1/2
- DIODE GPC CLOSE 5)
- 6)
- 7) 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/1R	RTLS:	3/1R	
LIFTOFF:	3/1R	TAL:	3/1R	
ONORBIT:	3/1R	AOA:	3/1R	
DEORBIT:	3/1R	ATO:	3/1R	
LANDING/SAFING:	3/1R			

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 - J3-117, J2-30, J3-116; J3-52, J5-40,

J3-53

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE THE VALVES WITH THE GPC. MANUAL SWITCH COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY TO CLOSE THE VALVE MAY PREVENT ISOLATION OF A THRUSTER LEAK.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 3/3

MDAC ID: 12135 FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE - GPC CLOSE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 1/2
- 5) DIODE GPC CLOSE

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		-, -

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 - J3-117, J2-30, J3-116; J3-52, J5-40,

J3-53

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2
MDAC ID: 12136 ABORT: 1/1

ITEM: DIODE - GPC OPEN

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 1/2
- 5) DIODE GPC OPEN

6)

7) 8)

9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	1/1
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 - J3-113, J2-44, J3-119; J3-62, J5-32,

J3-50

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:
LOSE CAPABILITY TO OPEN THE VALVE WITH THE GPC. MANUAL SWITCH
COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY TO OPEN THE
VALVE EFFECTS MISSION OBJECTIVES. INABILITY TO OPEN THE VALVE
DURING RTLS/TAL MAY CAUSE INABILITY TO COMPLETE AN OMS ABORT
DUMP.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12137 ABORT: 3/3

ITEM: DIODE - GPC OPEN

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 1/2
- 5) DIODE GPC OPEN

6) 7)

7)

8) 9)

### CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/3	RTLS:	3/3
3/3	TAL:	3/3
3/3	AOA:	3/3
3/3	ATO:	3/3
3/3		-, -
	3/3 3/3 3/3 3/3	3/3 RTLS: 3/3 TAL: 3/3 AOA: 3/3 ATO:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 - J3-113, J2-44, J3-119; J3-62, J5-32,

J3-50

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/2R ABORT: 2/1R SUBSYSTEM: ARCS MDAC ID: 12138

ITEM: DIODE - MANUAL OPEN

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 1/2
- 5) DIODE MANUAL OPEN

6)

7) 8)

9)

## CRITICALITIES

	CKITICKTITIES		
FLIGHT PHASE  PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	HDW/FUNC 3/3 3/3 3/2R 3/3 3/3	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 2/1R 2/1R 3/3 3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 - J3-3, J3-43; J3-66, J3-30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY OPEN THE VALVE. GPC COMMANDING TO OPEN THE VALVE STILL AVAILABLE. LOSS OF ALL REDUNDANCY TO OPEN THE VALVE MAY EFFECT MISSION OBJECTIVES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS

MDAC ID: 12139 FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE - MANUAL OPEN

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 1/2
- 5) DIODE MANUAL OPEN
- 6)
- 7)
- 8) 9)

CRITICALITIES

TT T			
FLIGHT PHASE PRELAUNCH:	HDW/FUNC 3/3	ABORT RTLS:	HDW/FUNC
LIFTOFF: ONORBIT:	3/3 3/3	TAL:	3/3 3/3 3/3
DEORBIT: LANDING/SAFING:	3/3 3/3	ATO:	3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 - J3-3, J3-43; J3-66, J3-30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT ON OPERATIONS.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R SUBSYSTEM: ARCS 3/1R ABORT: MDAC ID: 12140

DIODE - MANUAL CLOSE ITEM:

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX& FU CROSSFEED VLV 1/2 5) DIODE MANUAL CLOSE
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	: 3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 - J3-4, J2-29; J3-67, J5-29

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY CLOSE THE VALVE. GPC COMMANDING TO CLOSE THE VALE STILL AVAILABLE. LOSS OF ALL REDUNDANCY TO CLOSE THE VALVE MAY PREVENT ISOLATION OF A THRUSTER LEAK.

HIGHEST CRITICALITY HDW/FUNC

DATE: 10/01/87 SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12141 ABORT: 3/3

ITEM: DIODE - MANUAL CLOSE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 1/2
- 5) DIODE - MANUAL CLOSE

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		·

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 - J3-4, J2-29; J3-67, J5-29

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT ON OPERATION.

REFERENCES: VS70-943099 REV B EO B12; JSC 20923 PCN-1

E-404 REPORT DATE: 2/26/88

DATE: 10/01/87 HIGHEST CRITICALITY HW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12142 ABORT: 3/3

ITEM: DIODE - MANUAL OPEN/CLOSE INHIBIT

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 1/2
- 5) DIODE MANUAL OPEN/CLOSE INHIBIT

6)

7) 8)

9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 - J3-3, J2-43; J3-66, J5-30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE INHIBIT TO ENSURE "CLOSE" RELAYS UNLATCH WHILE ATTEMPTING TO OPEN THE VALVE MANUALLY. NO EFFECT ON OPERATION.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12143 ABORT: 3/1R

ITEM: DIODE - MANUAL OPEN/CLOSE INHIBIT

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 1/2
- 5) DIODE MANUAL OPEN/CLOSE INHIBIT

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	: 3/1R		•

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 - J3-3, J2-43; J3-66, J5-30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

IF THE VALVE IS ATTEMPTED TO BE CLOSED USING THE GPC, THE VALVE WILL CLOSE TEMPORARILY. HOWEVER, WITH THE SHORTED DIODE, "OPEN" RELAYS ARE ENABLED TO CONDUCT THUS OPENING THE VALVES. SWITCH OPERATION PREVENTS THIS FROM OCCURRING. LOSS OF ALL REDUNDANCY MAY PREVENT ISOLATION OF A THRUSTER LEAK.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12144 ABORT: 3/3

ITEM: DIODE - MANUAL CLOSE/OPEN INHIBIT

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 1/2
- 5) DIODE MANUAL CLOSE/OPEN INHIBIT

6) 7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	3/3	
LIFTOFF:	3/3	TAL:	3/3	
ONORBIT:	3/3	AOA:	3/3	
DEORBIT:	3/3	ATO:	3/3	
LANDING/SAFING	: 3/3		•	

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 - J3-4, J2-20; J3-67, J5-29

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE INHIBIT TO ENSURE "OPEN" RELAYS UNLATCH WHILE ATTEMPTING TO CLOSE THE VALVE MANUALLY. NO EFFECT ON OPERATION.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12145 ABORT: 3/3

ITEM: DIODE - MANUAL CLOSE/OPEN INHIBIT

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 1/2
- 5) DIODE MANUAL CLOSE/OPEN INHIBIT

6)

7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		, -

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, MCA 3

PART NUMBER: 56V76A116 - J3-4, J2-20; J3-67, J5-29

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

NO EFFECT. ONE OF TWO CLOSED RELAYS IN SERIES INHIBITED IS WORST EFFECT.

10/01/87 DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS

FLIGHT: 3/1R

MDAC ID: 12146

ABORT:

2/1R

ITEM:

L/R OX & FU CROSSFEED VLV 3/4/5 SWITCH 33, 35

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 3/4/5
- L/R OX & FU CROSSFEED VLV 3/4/5 SWITCH 33, 35

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: PNL 07 S33; PNL 07 S35

PART NUMBER: 33V73A7S33; S35

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY SWITCH THE VALVE OPEN OR CLOSE. REDUNDANCY TO OPEN OR CLOSE THE VALVE IS PROVIDED WITH THE GPC. LOSS OF ALL REDUNDANCY MAY PREVENT ISOLATION OF A THRUSTER LEAK.

10/01/87 DATE: HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 2/2 MDAC ID: 12147 ABORT: 1/1

ITEM: L/R OX & FU CROSSFEED VLV 3/4/5 SWITCH 33, 35

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 3/4/5
- 5) L/R OX & FU CROSSFEED VLV 3/4/5 SWITCH 33, 35

6) 7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	2/2	AOA:	3/1R
DEORBIT:	3/1R	ATO:	2/2
LANDING/SAFING	3: 3/1R		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 07 S33; PNL 07 S35 PART NUMBER: 33V73A7S33; S35

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY SWITCH THE VALVE ONCE IT SHORTS. NO REDUNDANCY IS AVAILABLE. INABILITY TO SWITCH THE VALVE CLOSED MAY EFFECT MISSION OBJECTIVES. INABILITY TO SWITCH VALVE OPEN DURING RTLS/TAL PREVENTS PROPELLANT TO BE EXPELLED.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE: FLIGHT: 2/2 SUBSYSTEM: ARCS

1/1 ABORT: MDAC ID: 12148

L/R OX & FU CROSSFEED VLV 3/4/5 SWITCH 33, 35 ITEM:

FAILURE MODE: SWITCH ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 3/4/5
- 5) L/R OX & FU CROSSFEED VLV 3/4/5 SWITCH 33, 35

6)

7) 8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	2/2	AOA:	3/1R
DEORBIT:	3/1R	ATO:	2/2
LANDING/SAFING:	3/1R		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 07 S33; PNL 07 S35

PART NUMBER: 33V73A7S33; S35

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE: A SHORT ACROSS EITHER CLOSE CONTACT SET (11, 12 OR 5, 6) WILL PREVENT THE VALVE FROM BEING OPENED. INABILITY TO OPEN THE CROSSFEED VALVE MAY EFFECT MISSION OBJECTIVES. INABILITY TO OPEN VALVE DURING RTLS/TAL PREVENTS PROPELLANTS TO BE EXPELLED.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12149 ABORT: 3/1R

ITEM: L/R OX & FU CROSSFEED VLV 3/4/5 SWITCH 33, 35

FAILURE MODE: SWITCH INADVERTENTLY FAILS OPEN/CLOSED

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 3/4/5
- 5) L/R OX & FU CROSSFEED VLV 3/4/5 SWITCH 33, 35

6)

7) 8)

9)

### CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/1R	RTLS:	3/1R
3/1R	TAL:	3/1R
3/1R	AOA:	3/1R
3/1R	ATO:	3/1R
: 3/1R		-,
	3/1R 3/1R 3/1R 3/1R	3/1R RTLS: 3/1R TAL: 3/1R AOA: 3/1R ATO:

REDUNDANCY SCREENS: A [ 2 ] B[NA] C[P]

LOCATION: PNL 07 S33; PNL 07 S35

PART NUMBER: 33V73A7S33; S35

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

IF VALVE IS CLOSED TO ISOLATE A THRUSTER LEAK, INADVERTENTLY OPENING THE VALVE PREVENTS ISOLATION OF THIS THRUSTER LEAK.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R SUBSYSTEM: ARCS 2/1R ABORT: MDAC ID: 12150

L/R OX & FU CROSSFEED VLV 3/4/5 SWITCH 33, 35

FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE (WORST CASE) ITEM:

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 3/4/5
- 5) L/R OX & FU CROSSFEED VLV 3/4/5 SWITCH 33, 35

6)

7) 8)

9)

## CRITICALITIES

	CRITTCHILITE		
PRELAUNCH:	HDW/FUNC 3/1R	ABORT RTLS: TAL:	HDW/FUNC 2/1R 2/1R
LIFTOFF: ONORBIT: DEORBIT:	3/1R 3/1R 3/1R	AOA: ATO:	3/1R 3/1R
LANDING/SAFING:	: 3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S33; PNL 07 S35

PART NUMBER: 33V73A7S33; S35

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

A SHORT TO CASE WILL BLOW THE 1 AMP FUSE THUS PREVENTING MANUAL SWITCHING OF VALVES. GPC COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY MAY PREVENT ISOLATION OF A THRUSTER LEAK.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS

MDAC ID: 12151 FLIGHT: 3/3
ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (OPEN CIRCUIT)

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 3/4/5
- 5) DIODE LIMIT SWITCH (OPEN CIRCUIT)
- 6)
- 7)
- 8) 9)

## CRITICALITIES

	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	3/3	
LIFTOFF:	3/3	TAL:	3/3	
ONORBIT:	3/3	AOA:	3/3	
DEORBIT:	3/3	ATO:	3/3	
LANDING/SAFING:	3/3		3/3	

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1; AV BAY 6, MCA 3

PART NUMBER: 54V76A114 - J3-46, J3-8, J3-35, J4-7; J2-64, J2-80, J2-73, J2-62

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE LOGIC TALKBACK TO TURN MOTOR OFF WHEN MOTOR WAS TURNED ON MANUALLY TO OPEN THE VALVE. MOTOR CAN WITHSTAND CONTINUOUS POWER. MOTOR TURNS OFF WHEN VALVE IS COMMANDED CLOSED. THUS, NO EFFECT TO OPERATION.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12152 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (OPEN CIRCUIT)

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 3/4/5
- 5) DIODE LIMIT SWITCH (OPEN CIRCUIT)

6) 7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		-

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1; AV BAY 6, MCA 3

PART NUMBER: 54V76A114 - J3-46, J3-8, J3-35, J4-7; J2-64, J2-80,

J2-73, J2-62

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12153 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (CLOSED CIRCUIT)

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 3/4/5
- 5) DIODE LIMIT SWITCH (CLOSED CIRCUIT)

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1; AV BAY 6, MCA 3

PART NUMBER: 54V76A114 - J3-86, J4-9; J2-65, J2-63

VIBRATAUSES: CONTAMINATION, MECHANICAL SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE LOGIC TALKBACK TO UNLATCH THE RELAY WHEN MOTOR WAS TURNED ON MANUALLY TO CLOSE THE VALVE. REDUNDANCY TO TURN MOTOR OFF IS PROVIDED. LOSS OF ALL REDUNDANCY CAUSES INABILITY TO TURN MOTOR OFF. MOTOR CAN WITHSTAND CONTINUOUS POWER. THUS, NO EFFECT TO OPERATION.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12154 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (CLOSED CIRCUIT)

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 3/4/5
- 5) DIODE LIMIT SWITCH (CLOSED CIRCUIT)

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1; AV BAY 6, MCA 3

PART NUMBER: 54V76A114 - J3-86, J4-9; J2-65, J2-63

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

ALLOWS ONE CONTACT SET ON THE SWITCH TO DISCONTINUE POWER TO BOTH "CLOSE" RELAYS. NO EFFECT ON OPERATION.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12155 ABORT: 3/1R

ITEM: DIODE - GPC CLOSE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 3/4/5
- 5) DIODE GPC CLOSE
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	: 3/1R		-

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AV BAY 4, MCA 1; AV BAY 6, MCA 3

PART NUMBER: 54V76A114 - J6-5, J1-56, J6-7; J3-80, J2-84, J3-81

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE THE VALVES WITH THE GPC. MANUAL SWITCH COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY TO CLOSE THE VALVE MAY PREVENT ISOLATION OF A THRUSTER LEAK.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE: FLIGHT: 3/3 SUBSYSTEM: ARCS 3/3 ABORT: MDAC ID: 12156

ITEM:

DIODE - GPC CLOSE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
  4) L/R OX & FU CROSSFEED VLV 3/4/5
  5) DIODE GPC CLOSE
- 6)
- 7) 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1; AV BAY 6, MCA 3

PART NUMBER: 54V76A114 - J6-5, J1-56, J6-7; J3-80, J2-84, J3-81

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12157 ABORT: 1/1

ITEM: DIODE - GPC OPEN

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 3/4/5
- 5) DIODE GPC OPEN
- 6)
- 7)
- 8)

9)

#### CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC	
3/3	RTLS:	1/1	
3/3	TAL:	1/1	
3/2R	AOA:	3/3	
3/3	ATO:	3/2R	
3/3		J, 210	
	3/3 3/3 3/2R 3/3	3/3 RTLS: 3/3 TAL: 3/2R AOA: 3/3 ATO:	

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 4, MCA 1; AV BAY 6, MCA 3

PART NUMBER: 54V76A114 - J6-8, J1-7, J6-49; J3-82, J2-83, J3-83

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN THE VALVE WITH THE GPC. MANUAL SWITCH COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY TO OPEN THE VALVE EFFECTS MISSION OBJECTIVES. INABILITY TO OPEN THE VALVE WITH THE GPC DURING RTLS/TAL ABORT MAY CAUSE INABILITY TO COMPLETE OMS ABORT DUMP.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12158 ABORT: 3/3

ITEM: DIODE - GPC OPEN

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 3/4/5
- 5) DIODE GPC OPEN
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		-

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1; AV BAY 6, MCA 3

PART NUMBER: 54V76A114 - J6-8, J1-7, J6-49; J3-82, J2-83, J3-83

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12159 ABORT: 2/1R

ITEM: DIODE - MANUAL OPEN

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 3/4/5
- 5) DIODE MANUAL OPEN
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING	: 3/3		·

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AV BAY 4, MCA 1; AV BAY 6, MCA 3

PART NUMBER: 54V76A114 - J6-48; J6-57; J3-91, J2-46

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY OPEN THE VALVE. GPC COMMANDING TO OPEN THE VALVE STILL AVAILABLE. LOSS OF ALL REDUNDANCY TO OPEN THE VALVE MAY EFFECT MISSION OBJECTIVES.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/3 SUBSYSTEM: ARCS 3/3 ABORT: MDAC ID: 12160

DIODE - MANUAL OPEN ITEM:

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 3/4/5 5) DIODE MANUAL OPEN
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	3/3	
LIFTOFF:	3/3	TAL:	3/3	
ONORBIT:	3/3	AOA:	3/3	
DEORBIT:	3/3	ATO:	3/3	
LANDING/SAFING:	3/3			

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1; AV BAY 6, MCA 3

PART NUMBER: 54V76A114 - J6-48; J6-57; J3-91, J2-46

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT ON OPERATIONS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12161 ABORT: 3/1R

ITEM: DIODE - MANUAL CLOSE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 3/4/5
- 5) DIODE MANUAL CLOSE

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		,

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AV BAY 4, MCA 1; AV BAY 6, MCA 3

PART NUMBER: 54V76A114 - J6-6, J3-16; J3-90, J2-68

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY CLOSE THE VALVE. GPC COMMANDING TO CLOSE THE VALVE STILL AVAILABLE. LOSS OF ALL REDUNDANCY TO CLOSE THE VALVE MAY PREVENT ISOLATION OF A THRUSTER LEAK.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12162 ABORT: 3/3

ITEM: DIODE - MANUAL CLOSE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 3/4/5
- 5) DIODE MANUAL CLOSE
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1; AV BAY 6, MCA 3

PART NUMBER: 54V76A14 - J6-6, J3-16; J3-90, J2-68

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT ON OPERATIONS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12163 ABORT: 3/3

ITEM: DIODE - MANUAL OPEN/CLOSE INHIBIT

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 3/4/5
- 5) DIODE MANUAL OPEN/CLOSE INHIBIT

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1; AV BAY 6, MCA 3

PART NUMBER: 54V76A114 - J6-48, J6-57; J3-91, J2-46

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE INHIBIT TO ENSURE "CLOSE" RELAYS UNLATCH WHILE ATTEMPTING TO OPEN THE VALVE MANUALLY. NO EFFECT ON OPERATIONS.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R ABORT: 3/1R SUBSYSTEM: ARCS MDAC ID: 12164

DIODE - MANUAL OPEN/CLOSE INHIBIT ITEM:

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- L/R OX & FU CROSSFEED VLV 3/4/5 4)
- DIODE MANUAL OPEN/CLOSE INHIBIT 5)

6)

7)

8) 9)

## CRITICALITIES

	CRITICALITIES		
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
<del></del>	3/1R	AOA:	3/1R
ONORBIT:	•	ATO:	3/1R
DEORBIT:	3/1R	23201	-, -
LANDING/SAFING:	3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

AV BAY 4, MCA 1; AV BAY 6, MCA 3 LOCATION:

PART NUMBER: 54V76A114 - J6-48, J6-57; J3-91, J2-46

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

IF THE VALVE IS ATTEMPTED TO BE CLOSED USING THE GPC, THE VALVE WILL CLOSE TEMPORARILY. HOWEVER, WITH THE SHORTED DIODE, OPEN RELAYS ARE ENABLED TO CONDUCT THUS OPENING THE VALVES. SWITCH OPERATIONS PREVENTS THIS FROM OCCURRING. LOSS OF ALL REDUNDANCY MAY PREVENT ISOLATION OF A THRUSTER LEAK.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12165 ABORT: 3/3

ITEM: DIODE - MANUAL CLOSE/OPEN INHIBIT

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 3/4/5
- 5) DIODE MANUAL CLOSE/OPEN INHIBIT

6)

7) 8)

9)

#### CRITICALITIES

77 7 4			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:		AIO.	3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1; AV BAY 6, MCA 3

PART NUMBER: 54V76A114 - J6-6, J3-16; J3-90, J2-68

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE INHIBIT TO ENSURE "OPEN" RELAYS UNLATCH WHILE ATTEMPTING TO CLOSE THE VALVE MANUALLY. NO EFFECT ON OPERATION.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE: FLIGHT: 3/3

SUBSYSTEM: ARCS ABORT: 3/3 MDAC ID: 12166

DIODE - MANUAL CLOSE/OPEN INHIBIT ITEM:

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 3/4/5
  5) DIODE MANUAL CLOSE/OPEN INHIBIT
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, MCA 1; AV BAY 6, MCA 3

PART NUMBER: 54V76A114 - J6-6, J3-16; J3-90, J2-68

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. ONE OF TWO CLOSE RELAYS IN SERIES INHIBITED IS WORST EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 3/2R

MDAC ID: 12167 ABORT: 1/1

ITEM: MASTER RCS CROSSFEED SWITCH 36 FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- PROP STOR & DIST SUBSYSTEM 3)
- L/R OX & FU CROSSFEED VLV 1/2 & 3/4/5
- MASTER RCS CROSSFEED SWITCH 36 5)

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	1/1	
LIFTOFF:	3/3	TAL:	1/1	
ONORBIT:	3/2R	AOA:	2/1R	
DEORBIT:	3/3	ATO:	3/3	
LANDING/SAFING:	3/3		-, -	

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S36 PART NUMBER: 33V73A7S36

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO FEED FROM LEFT OR RIGHT WITH GPC COMMANDS. MANUAL CONFIGURATION OF VALVES PROVIDES REDUNDANCY (AND OVERRIDES GPC COMMANDS). LOSS OF ALL REDUNDANCY WILL CAUSE THE INABILITY TO CROSSFEED AND MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS AND/OR C.G. SAFETY BOUNDARIES FOR RTLS/TAL ABORTS.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/2R SUBSYSTEM: ARCS ABORT: 1/1 MDAC ID: 12168

MASTER RCS CROSSFEED SWITCH 36 ITEM: FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 1/2 & 3/4/5 5) MASTER RCS CROSSFEED SWITCH 36

6)

7)

8) 9)

#### CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/3	RTLS:	1/1
3/3	TAL:	1/1
3/2R	AOA:	2/1R
3/3	ATO:	3/3
: 3/3		
	3/3 3/3 3/2R 3/3	3/3 RTLS: 3/3 TAL: 3/2R AOA: 3/3 ATO:

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S36 PART NUMBER: 33V73A7S36

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

FAILURE CAUSES CROSSFEEDING OPERATION FRO ONLY THE LEFT OR ONLY THE RIGHT. MANUAL CONFIGURATION OF VALVES PROVIDES REDUNDANCY (AND OVERRIDES GPC COMMANDS). LOSS OF ALL REDUNDANCY WILL CAUSE THE INABILITY TO CROSSFEED AND MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS AND/OR C.G. SAFETY BOUNDARIES FOR RTLS/TAL ABORTS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 3/2R

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12169 ABORT: 1/1

ITEM: MASTER RCS CROSSFEED SWITCH 36

FAILURE MODE: SWITCH FAILS SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 1/2 & 3/4/5
- 5) MASTER RCS CROSSFEED SWITCH 36

6) 7)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	1/1
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		,

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S36
PART NUMBER: 33V73A7S36

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

IF SWITCH FAILS SHORT ACROSS "OFF" CONTACTS (CONTACTS NOT IN A CIRCUIT) LOSE CAPABILITY TO PERFORM CROSSFEEDING OPERATIONS WITH THE GPC. THIS IS THE WORST CASE SINCE IT CAUSES INCREASED NUMBER OF MANUAL SWITCH MOVEMENTS TO CONFIGURE THE VALVES FOR CROSSFEEDING. LOSS OF THIS REDUNDANCY WILL CAUSE THE INABILITY TO CROSSFEED AND MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET THE TANK LANDING WEIGHT CONSTRAINTS AND/OR C.G. SAFETY BOUNDARIES FOR RTLS/TAL ABORTS.

REFERENCES: VS70-943099 REV B EO B12, CD

REPORT DATE: 2/26/88 E-432

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12170 ABORT: 1/1

ITEM: MASTER RCS CROSSFEED SWITCH 36

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 1/2 & 3/4/5

5) MASTER RCS CROSSFEED SWITCH 36

6)

7)

8) 9)

#### CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC	
3/3	RTLS:	1/1	
3/3	TAL:	1/1	
3/2R	AOA:	3/3	
3/3	ATO:	3/3	
3/3		-	
	3/3 3/2R 3/3	3/3 RTLS: 3/3 TAL: 3/2R AOA: 3/3 ATO:	

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S36
PART NUMBER: 33V73A7S36

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. SWITCH EASILY RETURNED TO PREVIOUS POSITION TO OFFSET

THE PROBLEM.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

SUBSYSTEM: ARCS FLIGHT: 3/2R ABORT: 1/1 MDAC ID: 12171

MASTER RCS CROSSFEED SWITCH 36 ITEM:

FAILURE MODE: SWITCH SHORT TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) L/R OX & FU CROSSFEED VLV 1/2 & 3/4/5
- 5) MASTER RCS CROSSFEED SWITCH 36
- 6)
- 7)
- 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	1/1
ONORBIT:	3/2R	AOA:	2/1R
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S36 PART NUMBER: 33V73A7S36

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

SHORT TO CASE MAY BLOW ONE, TWO OR ALL THESE 1 AMP FUSES SUPPORTING THE CIRCUIT. WORST CASE (2 OR MORE BLOWN), LOSE CAPABILITY TO AUTO CROSSFEED WITH THE GPC. MANUAL SWITCH CONFIGURATION PROVIDES REDUNDANCY. LOSS OF THIS WILL CAUSE THE INABILITY TO CROSSFEED AND MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET THE TANK LANDING WIEGHT CONSTRAINTS OR C.G. SAFETY MARGINS FOR RTLS/TAL ABORTS.

10/01/87 DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS

FLIGHT: 3/1R ABORT:

2/1R

MDAC ID: 12172

ITEM: MANIFOLD 1, L/R OX & FU ISOL VLV SWITCHES 22, 27

FAILURE MODE: FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1, L/R OX & FU ISOL VLVS

5) MANIFOLD 1, L/R OX & FU ISOL VLV SWITCHES 22, 27

6)

7) 8)

9)

#### CRITICALITIES

	<b></b>		
FLIGHT PHASE H	IDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
	3/1R	AOA:	3/1R
ONORBIT:	•	ATO:	3/1R
DEORBIT:	3/1R	AIO.	J/
LANDING/SAFING:	3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S22, S27 PART NUMBER: 33V73A7S22, S27

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY OPEN (CLOSE) THE VALVE. GPC COMMANDS PROVIDE REDUNDANCY TO OPEN (CLOSE) THE VALVE. LOSS OF ALL REDUNDANCY TO OPEN THE VALVE MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANT TO MEET LANDING WEIGHT CONSTRAINTS. INABILITY TO CLOSE VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. BOTH WARRANT LOSS OF CREW/VEHICLE.

DATE:

10/01/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS MDAC ID:

12173

FLIGHT: 3/1R

ITEM:

ABORT:

1/1

MANIFOLD 1, L/R OX & FU ISOL VLV SWITCHES 22, 27

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- PROP STOR & DIST SUBSYSTEM 3)
- 4) MANIFOLD 1, L/R OX & FU ISOL VLVS
- 5) MANIFOLD 1, L/R OX & FU ISOL VLV SWITCHES 22, 27

6)

7)

8) 9)

#### CRITICALITIES

	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		-, -1:

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S22, S27

PART NUMBER: 33V73A7S22, S27

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

IF SWITCH SHORTS ACROSS CLOSE CONTACTS, CAPABILITY TO OPEN THE VALVE IS LOST. REDUNDANCY PROVIDED BY THRUSTERS WHICH FIRE IN THE SAME DIRECTION ON DIFFERENT MANIFOLDS. LOSS OF ALL REDUNDANCY MAY CAUSE EXCEEDANCE OF LANDING WEIGHT CONSTRAINTS SINCE PROPELLANT CANNOT BE RELEASED. THIS MAY RESULT IN LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12174 ABORT: 1/1

ITEM: MANIFOLD 1, L/R OX & FU ISOL VLV SWITCHES 22, 27

FAILURE MODE: SWITCH SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1, L/R OX & FU ISOL VLVS
- 5) MANIFOLD 1, L/R OX & FU ISOL VLV SWITCHES 22, 27

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	•		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S22, S27 PART NUMBER: 33V73A7S22, S27

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

IF SWITCH SHORTS ACROSS CONTACT SET 5, 6 (CLOSE), CAPABILITY TO OPEN THE VALVE IS LOST. REDUNDANCY PROVIDED BY THRUSTERS WHICH FIRE IN THE SAME DIRECTION ON DIFFERENT MANIFOLDS. LOSS OF ALL REDUNDANCY MAY CAUSE EXCEEDANCE OF LANDING WEIGHT CONSTRAINTS SINCE PROPELLANT CANNOT BE EXPELLED. THIS MAY RESULT MAY RESULT IN LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12175 ABORT: 3/1R

ITEM: MANIFOLD 1, L/R OX & FU ISOL VLV SWITCHES 22, 27 FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1, L/R OX & FU ISOL VLVS
- 5) MANIFOLD 1, L/R OX & FU ISOL VLV SWITCHES 22, 27

6) 7)

7) 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S22, S27 PART NUMBER: 33V73A7S22, S27

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

IF VALVE WAS CLOSED IN ORDER TO ISOLATE A THRUSTER LEAK. INADVERTENTLY OPENING THE VALVE PREVENTS ISOLATION OF THIS THRUSTER LEAK CAUSING LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12176 ABORT: 2/1R

ITEM: MANIFOLD 1, L/R OX & FU ISOL VLV SWITCHES 22, 27 FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1, L/R OX & FU ISOL VLVS

5) MANIFOLD 1, L/R OX & FU ISOL VLV SWITCHES 22, 27

6) 7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S22, S27 PART NUMBER: 33V73A7S22, S27

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

IF SWITCH SHORTS TO CASE, THE 1 AMP FUSE WILL BLOW CAUSING THE INABILITY TO OPEN/CLOSE THE VALVE MANUALLY. GPC COMMANDING OF THE VALVE STILL AVAILABLE. LOSS OF THIS REDUNDANCY PREVENTS FURTHER VALVE MOVEMENT THUS POSSIBLE EXCEEDANCE OF LANDING WEIGHT WHICH MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12177 ABORT: 2/1R

ITEM: MANIFOLD 2, L/R OX & FU ISOL VLV SWITCHES 23, 28

FAILURE MODE: FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 2, L/R OX & FU ISOL VLVS
- 5) MANIFOLD 2, L/R OX & FU ISOL VLV SWITCHES 23, 28

6) 7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	3/1R		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S23, S28 PART NUMBER: 33V73A7S23, S28

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE CAPABILITY TO MANUALLY OPEN (CLOSE) THE VALVE. GPC COMMANDS PROVIDE REDUNDANCY TO OPEN (CLOSE) THE VALVE. LOSS OF ALL REDUNDANCY TO OPEN THE VALVE MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANT TO MEET LANDING WEIGHT CONSTRAINTS. INABILITY TO CLOSE VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. BOTH WARRANT LOSS OF CREW/VEHICLE.

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

FLIGHT: 3/1R SUBSYSTEM: ARCS 1/1 ABORT: MDAC ID: 12178

MANIFOLD 2, L/R OX & FU ISOL VLV SWITCHES 23, 28 ITEM:

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 2, L/R OX & FU ISOL VLVS
- 5) MANIFOLD 2, L/R OX & FU ISOL VLV SWITCHES 23, 28

6) 7)

8) 9)

## CRITICALITIES

	CRITICA	TITIES	
FLIGHT PHASE PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	HDW/FUNC 3/3 3/1R 3/2R 3/1R : 3/3	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 1/1 1/1 3/3 3/2R
DEORBIT:	3/1R	ATO:	3/2R

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S23, S28 PART NUMBER: 33V73A7S23, S28

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

IF SWITCH SHORTS ACROSS CLOSE CONTACTS, CAPABILITY TO OPEN THE VALVE IS LOST. REDUNDANCY PROVIDED BY THRUSTERS WHICH FIRE IN THE SAME DIRECTION ON DIFFERENT MANIFOLDS. LOSS OF ALL REDUNDANCY MAY CAUSE EXCEEDANCE OF LANDING WEIGHT CONSTRAINTS SINCE PROPELLANT CANNOT BE RELEASED. THIS MAY RESULT IN LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12179 ABORT: 1/1

ITEM: MANIFOLD 2, L/R OX & FU ISOL VLV SWITCHES 23, 28

FAILURE MODE: SWITCH SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- MANIFOLD 2, L/R OX & FU ISOL VLVS 4)
- MANIFOLD 2, L/R OX & FU ISOL VLV SWITCHES 23, 28 5)

6)

7) 8)

9)

## CRITICALITIES

FLIGHT PHASE PRELAUNCH:	HDW/FUNC	ABORT	HDW/FUNC
LIFTOFF:	3/3 3/1R	RTLS:	1/1
ONORBIT:	3/1R 3/2R	TAL: AOA:	1/1
DEORBIT:	3/1R	ATO:	3/3 3/2R
LANDING/SAFING:	3/3	AIO.	3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S23, S28 PART NUMBER: 33V73A7S23, S28

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

IF SWITCH SHORTS ACROSS CONTACT SET 5, 6 (CLOSE), CAPABILITY TO OPEN THE VALVE IS LOST. REDUNDANCY PROVIDED BY THRUSTERS WHICH FIRE IN THE SAME DIRECTION ON DIFFERENT MANIFOLDS. LOSS OF ALL REDUNDANCY MAY CAUSE EXCEEDANCE OF LANDING WEIGHT CONSTRAINTS SINCE PROPELLANT CANNOT BE EXPELLED. THIS MAY RESULT MAY RESULT IN LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12180 ABORT: 3/1R

ITEM: MANIFOLD 2, L/R OX & FU ISOL VLV SWITCHES 23, 28 FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 2, L/R OX & FU ISOL VLVS
- 5) MANIFOLD 2, L/R OX & FU ISOL VLV SWITCHES 23, 28

6)

7) 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S23, S28 PART NUMBER: 33V73A7S23, S28

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

IF VALVE WAS CLOSED IN ORDER TO ISOLATE A THRUSTER LEAK. INADVERTENTLY OPENING THE VALVE PREVENTS ISOLATION OF THIS THRUSTER LEAK CAUSING LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12181 ABORT: 2/1R

ITEM: MANIFOLD 2, L/R OX & FU ISOL VLV SWITCHES 23, 28 FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 2, L/R OX & FU ISOL VLVS
- 5) MANIFOLD 2, L/R OX & FU ISOL VLV SWITCHES 23, 28

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		- -

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S23, S28 PART NUMBER: 33V73A7S23, S28

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

IF SWITCH SHORTS TO CASE, THE 1 AMP FUSE WILL BLOW CAUSING THE INABILITY TO OPEN/CLOSE THE VALVE MANUALLY. GPC COMMANDING OF THE VALVE STILL AVAILABLE. LOSS OF THIS REDUNDANCY PREVENTS FURTHER VALVE MOVEMENT THUS POSSIBLE EXCEEDANCE OF LANDING WEIGHT WHICH MAY CAUSE LOSS OF CREW/VEHICLE.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R SUBSYSTEM: ARCS 2/1R ABORT: MDAC ID: 12182

ITEM: MANIFOLD 3, L/R OX & FU ISOL VLV SWITCHES 24, 29

FAILURE MODE: FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 3, L/R OX & FU ISOL VLVS
- 5) MANIFOLD 3, L/R OX & FU ISOL VLV SWITCHES 24, 29

6)

7) 8)

9)

### CRITICALITIES

	CVITICS	MITITU	
FLIGHT PHASE  PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	HDW/FUNC 3/1R 3/1R 3/1R 3/1R	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 2/1R 2/1R 3/1R 3/1R

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S24, S29 PART NUMBER: 33V73A7S24, S29

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

LOSE CAPABILILTY TO MANUALLY OPEN (CLOSE) THE VALVE. GPC COMMANDS PROVIDE REDUNDANCY TO OPEN (CLOSE) THE VALVE. LOSS OF ALL REDUNDANCY TO OPEN THE VALVE MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANT TO MEET LANDING WEIGHT CONSTRAINTS. INABILITY TO CLOSE VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. BOTH WARRANT LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R
MDAC ID: 12183 ABORT: 1/1

ITEM: MANIFOLD 3, L/R OX & FU ISOL VLV SWITCHES 24, 29

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR &IST SUBSYSTEM
- 4) MANIFOLD 3, L/R OX & FU ISOL VLVS
- 5) MANIFOLD 3, L/R OX & FU ISOL VLV SWITCHES 24, 29

6) 7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	$\frac{1}{1}$
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		J/ 210

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S24, S29 PART NUMBER: 33V73A7S24, S29

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

IF SWITCH SHORTS ACROSS CLOSE CONTACTS, CAPABILITY TO OPEN THE VALVE IS LOST. REDUNDANCY PROVIDED BY THRUSTERS WHICH FIRE IN THE SAME DIRECTION ON DIFFERENT MANIFOLDS. LOSS OF ALL REDUNDANCY MAY CAUSE EXCEEDANCE OF LANDING WEIGHT CONSTRAINTS SINCE PROPELLANT CANNOT BE RELEASED. THIS MAY RESULT IN LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12184 ABORT: 3/1R

ITEM: MANIFOLD 3, L/R OX & FU ISOL VLV SWITCHES 24, 29

FAILURE MODE: SWITCH SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 3, L/R OX & FU ISOL VLVS
- 5) MANIFOLD 3, L/R OX & FU ISOL VLV SWITCHES 24, 29

6) 7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	•		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S24, S29 PART NUMBER: 33V73A7S24, S29

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

IF SWITCH SHORTS ACROSS CONTACT SET 5, 6 (CLOSE), CAPABILITY TO OPEN THE VALVE IS LOST. REDUNDANCY PROVIDED BY THRUSTERS WHICH FIRE IN THE SAME DIRECTION ON DIFFERENT MANIFOLDS. LOSS OF ALL REDUNDANCY MAY CAUSE EXCEEDANCE OF LANDING WEIGHT CONSTRAINTS SINCE PROPELLANT CANNOT BE EXPELLED. THIS MAY RESULT MAY RESULT IN LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12185 ABORT: 3/1R

ITEM: MANIFOLD 3, L/R OX & FU ISOL VLV SWITCHES 24, 29 FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 3, L/R OX & FU ISOL VLVS
- 5) MANIFOLD 3, L/R OX & FU ISOL VLV SWITCHES 24, 29

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7)

8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S24, S29 PART NUMBER: 33V73A7S24, S29

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

IF VALVE WAS CLOSED IN ORDER TO ISOLATE A THRUSTER LEAK. INADVERTENTLY OPENING THE VALVE PREVENTS ISOLATION OF THIS THRUSTER LEAK CAUSING LOSS OF CREW/VEHICLE.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R SUBSSTEM: ARCS 2/1R ABORT: MDAC ID: 12186

MANIFOLD 3, L/R OX & FU ISOL VLV SWITCHES 24, 29 ITEM: FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
  3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 3, L/R OX & FU ISOL VLVS
- 5) MANIFOLD 3, L/R OX & FU ISOL VLV SWITCHES 24, 29

6)

7)

8) 9)

#### CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/3	RTLS:	2/1R
3/1R	TAL:	2/1R
•	AOA:	3/3
3/1R	ATO:	3/2R
: 3/3		
	3/3 3/1R 3/2R 3/1R	3/3 RTLS: 3/1R TAL: 3/2R AOA: 3/1R ATO:

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S24, S29 PART NUMBER: 33V73A7S24, S29

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

IF SWITCH SHORTS TO CASE, THE 1 AMP FUSE WILL BLOW CAUSING THE INABILITY TO OPEN/CLOSE THE VALVE MANUALLY. GPC COMMANDING OF THE VALVE STILL AVAILABLE. LOSS OF THIS REDUNDANCY PREVENTS FURTHER VALVE MOVEMENT THUS POSSIBLE EXCEEDANCE OF LANDING WEIGHT WHICH MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12187 ABORT: 2/1R

ITEM: MANIFOLD 4, L/R OX & FU ISOL VLV SWITCHES 25, 30

FAILURE MODE: FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, L/R OX & FU ISOL VLVS
- 5) MANIFOLD 4, L/R OX & FU ISOL VLV SWITCHES 25, 30

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE PRELAUNCH: LIFTOFF:	HDW/FUNC 3/1R 3/1R	ABORT RTLS:	HDW/FUNC 2/1R
ONORBIT: DEORBIT:	3/1R 3/1R 3/1R	TAL: AOA: ATO:	2/1R 3/1R 3/1R
LANDING/SAFING:	3/1R		-/

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S25, S30 PART NUMBER: 33V73A7S25, S30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILILTY TO MANUALLY OPEN (CLOSE) THE VALVE. GPC COMMANDS PROVIDE REDUNDANCY TO OPEN (CLOSE) THE VALVE. LOSS OF ALL REDUNDANCY TO OPEN THE VALVE MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANT TO MEET LANDING WEIGHT CONSTRAINTS. INABILITY TO CLOSE VALVE PREVENTS ISOLATION OF A THRUSTER LEAK. BOTH WARRANT LOSS OF CREW/VEHICLE.

REFERENCES: VS70-943099 REV B EO B12, CE, DE

REPORT DATE : 2/26/88 E-450

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12188 ABORT: 1/1

ITEM: MANIFOLD 4, L/R OX & FU ISOL VLV SWITCHES 25, 30

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, L/R OX & FU ISOL VLVS
- 5) MANIFOLD 4, L/R OX & FU ISOL VLV SWITCHES 25, 30

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S25, S30 PART NUMBER: 33V73A7S25, S30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

IF SWITCH SHORTS ACROSS CLOSE CONTACTS, CAPABILITY TO OPEN THE VALVE IS LOST. REDUNDANCY PROVIDED BY THRUSTERS WHICH FIRE IN THE SAME DIRECTION ON DIFFERENT MANIFOLDS. LOSS OF ALL REDUNDANCY MAY CAUSE EXCEEDANCE OF LANDING WEIGHT CONSTRAINTS SINCE PROPELLANT CANNOT BE RELEASED. THIS MAY RESULT IN LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12189 ABORT: 1/1

ITEM: MANIFOLD 4, L/R OX & FU ISOL VLV SWITCHES 25, 30

FAILURE MODE: SWITCH SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, L/R OX & FU ISOL VLVS
- 5) MANIFOLD 4, L/R OX & FU ISOL VLV SWITCHES 25, 30

6)

7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		·

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S25, S30 PART NUMBER: 33V73A7S25, S30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

IF SWITCH SHORTS ACROSS CONTACT SET 5, 6 (CLOSE), CAPABILITY TO OPEN THE VALVE IS LOST. REDUNDANCY PROVIDED BY THRUSTERS WHICH FIRE IN THE SAME DIRECTION ON DIFFERENT MANIFOLDS. LOSS OF ALL REDUNDANCY MAY CAUSE EXCEEDANCE OF LANDING WEIGHT CONSTRAINTS SINCE PROPELLANT CANNOT BE EXPELLED. THIS MAY RESULT MAY RESULT IN LOSS OF CREW/VEHICLE.

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

FLIGHT: 3/1R ABORT: 3/1R SUBSYSTEM: ARCS MDAC ID: 12190

MANIFOLD 4, L/R OX & FU ISOL VLV SWITCHES 25, 30 ITEM: FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS

- 3) PROP STOR & DIST SUBSYSTEM
  4) MANIFOLD 4, L/R OX & FU ISOL VLVS
  5) MANIFOLD 4, L/R OX & FU ISOL VLV SWITCHES 25, 30

6) 7)

8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	•		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S25, S30 PART NUMBER: 33V73A7S25, S30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

IF VALVE WAS CLOSED IN ORDER TO ISOLATE A THRUSTER LEAK. INADVERTENTLY OPENING THE VALVE PREVENTS ISOLATION OF THIS THRUSTER LEAK CAUSING LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12191 ABORT: 2/1R

ITEM: MANIFOLD 4, L/R OX & FU ISOL VLV SWITCHES 25, 30 FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, L/R OX & FU ISOL VLVS
- MANIFOLD 4, L/R OX & FU ISOL VLV SWITCHES 25, 30 5)

6)

7)

8) 9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3	+ •	-/

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 07 S25, S30 PART NUMBER: 33V73A7S25, S30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

IF SWITCH SHORTS TO CASE, THE 1 AMP FUSE WILL BLOW CAUSING THE INABILITY TO OPEN/CLOSE THE VALVE MANUALLY. GPC COMMANDING OF THE VALVE STILL AVAILABLE. LOSS OF THIS REDUNDANCY PREVENTS FURTHER VALVE MOVEMENT THUS POSSIBLE EXCEEDANCE OF LANDING WEIGHT WHICH MAY CAUSE LOSS OF CREW/VEHICLE.

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87 FLIGHT: 3/3

SUBSYSTEM: ARCS 3/3 ABORT: MDAC ID: 12192

DIODE - LIMIT SWITCH (OPEN CIRCUIT) ITEM:

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1, L/R OX & FU ISOL VLVS 5) DIODE LIMIT SWITCH (OPEN CIRCUIT)
- 6)
- 7) 8)
- 9)

#### CRITICALITIES

PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT:	HDW/FUNC 3/3 3/3 3/3 3/3	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 3/3 3/3 3/3 3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #2

PART NUMBER: J1-57, 67; J1-54, 63

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE LOGIC TALKBACK TO TURN MOTOR OFF. MOTOR CAN WITHSTAND CONTINUOUS POWER. VALVE MOVEMENT OPEN AND CLOSE STILL OPERABLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12193 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (OPEN CIRCUIT)

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1, L/R OX & FU ISOL VLVS
- 5) DIODE LIMIT SWITCH (OPEN CIRCUIT)

6)

7)

8)

9)

#### CRITICALITIES

	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		J/ J

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #2

PART NUMBER: J1-57, 67; J1-54, 63

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE ISOLATION BETWEEN MANUAL CLOSE AND SWITCH

TALKBACK DISPLAY.

111REFERENCES: VS70-943099 REV B EO B12; JSC SPACE SHUTTLE SYSTEMS HANDBOOK

SISIEMS HANDROOK

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12194 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (CLOSE CIRCUIT)

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1, L/R OX & FU ISOL VLVS
- 5) DIODE LIMIT SWITCH (CLOSE CIRCUIT)

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #2

PART NUMBER: J1-56, 66; J1-53, 64

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE TALKBACK LOGIC TO TURN MOTOR OFF. MOTOR CAN WITHSTAND CONTINUOUS POWER. VALVE MOVEMENT OPEN AND CLOSE STILL OPERABLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12195 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (CLOSE CIRCUIT)

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1, L/R OX & FU ISOL VLVS
- 5) DIODE LIMIT SWITCH (CLOSE CIRCUIT)

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		,

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #2

PART NUMBER: J1-56, 66; J1-53, 64

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE ISOLATION BETWEEN MANUAL OPEN AND SWITCH

TALKBACK DISPLAY.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE

SYSTEMS HANDBOOK

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12196 ABORT: 3/1R

ITEM: DIODE - GPC CLOSE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1, L/R OX & FU ISOL VLVS
- 5) DIODE GPC CLOSE

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	: 3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AFT MCA #2

PART NUMBER: J3-33, J1-33; J3-87, J1-87

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE GPC COMMAND TO CLOSE THE VALVE. MANUAL COMMANDING AND SECOND GPC COMMAND STILL AVAILABLE. LOSS OF ALL REDUNDANCY MAY CAUSE THE INABILITY ISOLATE A LEAK, WHICH MAY LEAD TO LOSS OF CREW/VEHICLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12197 ABORT: 3/3

ITEM: DIODE - GPC CLOSE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1, L/R OX & FU ISOL VLVS
- 5) DIODE GPC CLOSE
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #2

PART NUMBER: J3-33, J1-33; J3-87, J1-87

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE

SYSTEMS HANDBOOK

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12198 ABORT: 2/1R

ITEM: DIODE - GPC OPEN

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1, L/R OX & FU ISOL VLVS

5) DIODE - GPC OPEN

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AFT MCA #2
PART NUMBER: J1-23; J1-20

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE GPC COMMAND TO OPEN THE VALVE. MANUAL COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY TO OPEN THE VALVE MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12199 ABORT: 2/1R

ITEM: DIODE - GPC OPEN

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1, L/R OX & FU ISOL VLVS
- 5) DIODE GPC OPEN

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING.	3/3		-,

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #2 PART NUMBER: J1-23; J1-20

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: ARCS MDAC ID: 12231

DIODE - GPC OPEN ITEM:

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 3, L/R OX & FU ISOL VLVS 5) DIODE GPC OPEN

6)

7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #3 PART NUMBER: J2-21; CR32

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12200 ABORT: 2/1R

ITEM: DIODE - MANUAL OPEN

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL OPEN
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING	: 3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AFT MCA #2
PART NUMBER: J1-43; J1-86

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE MANUAL COMMAND TO OPEN THE VALVE. GPC COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: ARCS MDAC ID: 12201

ITEM: DIODE - MANUAL OPEN

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
  3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1, L/R OX & FU ISOL VLVS 5) DIODE MANUAL OPEN

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #2 PART NUMBER: J1-43; J1-86

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 3/1R

MDAC ID: 12202 ABORT: 3/1R

ITEM: DIODE - MANUAL CLOSE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL CLOSE

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		,

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AFT MCA #2 PART NUMBER: J1-34; J1-85

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE MANUAL COMMAND TO CLOSE THE VALVE. GPC COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY MAY CAUSE THE INABILITY TO ISOLATE A THRUSTER LEAK WHICH MAY LEAD TO LOSS OF CREW/VEHICLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12203 ABORT: 3/3

ITEM: DIODE - MANUAL CLOSE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL CLOSE

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #2
PART NUMBER: J1-34; J1-85

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12204 ABORT: 3/3

ITEM: DIODE - MANUAL OPEN/CLOSE INHIBIT

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL OPEN/CLOSE INHIBIT

6)

7)

8) 9)

#### CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/3	RTLS:	3/3
3/3	TAL:	3/3
3/3	AOA:	3/3
3/3	ATO:	3/3
: 3/3		•
	3/3 3/3 3/3 3/3	3/3 RTLS: 3/3 TAL: 3/3 AOA: 3/3 ATO:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #2
PART NUMBER: J1-43; J1-86

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE "POWER OFF" INHIBIT TO THE CLOSE RELAYS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE: 2/26/88 E-468

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

FLIGHT: 3/1R ABORT: 3/1R SUBSYSTEM: ARCS MDAC ID: 12205

ITEM: DIODE - MANUAL OPEN/CLOSE INHIBIT

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
  4) MANIFOLD 1, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL OPEN/CLOSE INHIBIT

6)

7)

8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	: 3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AFT MCA #2 PART NUMBER: J1-43; J1-86

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE THE VALVE. LOSS OF ALL REDUNDANCY MAY CAUSE THE INABILITY TO ISOLATE A THRUSTER LEAK WHICH MAY LEAD TO LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12206 ABORT: 3/3

ITEM: DIODE - MANUAL CLOSE/OPEN INHIBIT

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- MANIFOLD 1, L/R OX & FU ISOL VLVS 4)
- DIODE MANUAL CLOSE/OPEN INHIBIT 5)
- 6)
- 7) 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #2 PART NUMBER: J1-34; J1-85

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE "POWER OFF" INHIBIT TO THE OPEN RELAY.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE

SYSTEMS HANDBOOK

10/01/87 DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS

FLIGHT: 3/1R ABORT: 2/1R

MDAC ID: 12207

ITEM:

DIODE - MANUAL CLOSE/OPEN INHIBIT

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 1, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL CLOSE/OPEN INHIBIT

6)

7)

8) 9)

CRITICALITIES

PRELAUNCH: LIFTOFF: ONORBIT:	HDW/FUNC 3/3 3/3 3/2R 3/1R	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 2/1R 2/1R 3/3 3/2R
DEORBIT: LANDING/SAFING:		ATO:	3/2R

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AFT MCA #2 PART NUMBER: J1-34; J1-85

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

IF THE VALVE WAS OPENED WITH THE GPC, LOSE CAPABILITY TO RE-OPEN THE VALVE. MANUAL SWITCH REDUNDANCY PROVIDED. LOSS OF ALL REDUNDANCY MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT TO MEET LANDING WEIGHT CONSTRAINTS AND/OR C.G. SAFETY MARGINS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12208 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (OPEN CIRCUIT)

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 2, L/R OX & FU ISOL VLVS
- 5) DIODE LIMIT SWITCH (OPEN CIRCUIT)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	3/3	
LIFTOFF:	3/3	TAL:	3/3	
ONORBIT:	3/3	AOA:	3/3	
DEORBIT:	3/3	ATO:	3/3	
LANDING/SAFING:	3/3		-, -	

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #1

PART NUMBER: J2-40, 28; J2-42, 31

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE LOGIC TALKBACK TO TURN MOTOR OFF. MOTOR CAN WITHSTAND CONTINUOUS POWER. VALVE MOVEMENT OPEN AND CLOSE STILL OPERABLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS&a1152HHANDBOOK

REPORT DATE: 2/26/88

10/01/87 HIGHEST CRITICALITY HDW/FUNC DATE: FLIGHT: 3/3 SUBSYSTEM: ARCS 3/3 MDAC ID: 12209 ABORT:

DIODE - LIMIT SWITCH (OPEN CIRCUIT) ITEM:

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 2, L/R OX & FU ISOL VLVS 5) DIODE LIMIT SWITCH (OPEN CIRCUIT)
- 6)
- 7) 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #1

PART NUMBER: J2-40, 28; J2-42, 31

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE ISOLATION BETWEEN MANUAL CLOSE AND SWITCH

TALKBACK DISPLAY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 ABORT: 3/3 MDAC ID: 12210

ITEM: DIODE - LIMIT SWITCH (CLOSE CIRCUIT)

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 2, L/R OX & FU ISOL VLVS
- 5) DIODE LIMIT SWITCH (OPEN CIRCUIT)

6)

7)

8)

9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		• -

REDUNDANCY SCREENS: A [ ]3096HB [ ] C [ ]

LOCATION: AFT MCA #1

PART NUMBER: J2-41, 29; J2-43, 32

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE TALKBACK LOGIC TO TURN MOTOR OFF. MOTOR CAN WITHSTAND CONTINUOUS POWER. VALVE MOVEMENT OPEN AND CLOSE STILL OPERABLE.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE: FLIGHT: 3/3 SUBSYSTEM: ARCS 3/3 ABORT: MDAC ID: 12211

ITEM:

DIODE - LIMIT SWITCH (CLOSE CIRCUIT)

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
  4) MANIFOLD 2, L/R OX & FU ISOL VLVS
- 5) DIODE LIMIT SWITCH (OPEN CIRCUIT)

6)

7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	•		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #1

PART NUMBER: J2-41, 29; J2-43, 32

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE ISOLATION BETWEEN MANUAL OPEN AND SWITCH

TALKBACK DISPLAY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12212 ABORT: 3/1R

ITEM: DIODE - GPC CLOSE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 2, L/R OX & FU ISOL VLVS
- 5) DIODE GPC CLOSE
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		,

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AFT MCA #1

PART NUMBER: J3-17, J2-55; J2-99, J3-2

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE GPC COMMAND TO CLOSE THE VALVE. MANUAL COMMANDING AND SECOND GPC COMMAND STILL AVAILABLE. LOSS OF ALL REDUNDANCY MAY CAUSE THE INABILITY ISOLATE A LEAK, WHICH MAY LEAD TO LOSS OF CREW/VEHICLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE: 2/26/88 E-476

HIGHEST CRITICALITY HDW/FUNC 10/01/BATE:

FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: ARCS MDAC ID: 12213

DIODE - GPC CLOSE ITEM:

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 2, L/R OX & FU ISOL VLVS 5) DIODE GPC CLOSE
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #1

PART NUMBER: J3-17, J2-55; J2-99, J3-2

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12214 ABORT: 2/1R

ITEM: DIODE - GPC OPEN

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 2, L/R OX & FU ISOL VLVS
- 5) DIODE GPC OPEN
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AFT MCA #1
PART NUMBER: J2-5, J2-58

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE GPC COMMAND TO OPEN THE VALVE. MANUAL COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY TO OPEN THE VALVE MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE : 2/26/88 E-478

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12215 ABORT: 3/3

ITEM: DIODE - GPC OPEN

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 2, L/R OX & FU ISOL VLVS
- 5) DIODE GPC OPEN

6)

7) 8)

9)

### CRITICALITIES

		3 DODE	HDW/FUNC
FLIGHT PHASE	HDW/FUNC	ABORT	•
PRELAUNCH:	3/3	RTLS:	3/3
	3/3	TAL:	3/3
LIFTOFF:	•	AOA:	3/3
ONORBIT:	3/3		•
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #1
PART NUMBER: J2-5; J2-58

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12216 ABORT: 2/1R

ITEM: DIODE - MANUAL OPEN

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
  4) MANIFOLD 2, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL OPEN

6)

7)

8)

9)

## CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/3	RTLS:	2/1R
3/3	TAL:	2/1R
3/2R	AOA	3/3
3/1R	ATO:	3/2R
3/3		-/
	3/3 3/3 3/2R 3/1R	3/3 RTLS: 3/3 TAL: 3/2R AOA 3/1R ATO:

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AFT MCA #1 PART NUMBER: J2-12; J2-57

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

LOSE MANUAL COMMAND TO OPEN THE VALVE. GPC COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE: FLIGHT: 3/3 SUBSYSTEM: ARCS ABORT: 3/3 MDAC ID: 12217

ITEM:

DIODE - MANUAL OPEN

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
  4) MANIFOLD 2, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL OPEN

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #1 PART NUMBER: J2-12; J2-57

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12218 ABORT: 3/1R

ITEM: DIODE - MANUAL CLOSE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 2, L/R OX & FU ISOL VLVS

5) DIODE - MANUAL CLOSE

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		,

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AFT MCA #1 PART NUMBER: J2-11; J2-47

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE MANUAL COMMAND TO CLOSE THE VALVE. GPC COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY MAY CAUSE THE INABILITY TO ISOLATE A THRUSTER LEAK WHICH MAY LEAD TO LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12219 ABORT: 3/3

ITEM: DIODE - MANUAL CLOSE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 2, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL CLOSE
- 6)
- 7) 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
	•		•
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #1
PART NUMBER: J2-11; J2-47

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12220 ABORT: 3/3

ITEM: DIODE - MANUAL OPEN/CLOSE INHIBIT

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 2, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL OPEN/CLOSE INHIBIT

6) 7)

8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		-, -

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #1
PART NUMBER: J2-12; J2-57

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE "POWER OFF" INHIBIT TO THE CLOSE RELAYS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE : 2/26/88 E-484

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HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R ABORT: 3/1R SUBSYSTEM: ARCS MDAC ID: 12221

DIODE - MANUAL OPEN/CLOSE INHIBIT ITEM:

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
  3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 2, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL OPEN/CLOSE INHIBIT

6)

7) 8)

9)

### CRITICALITIES

FLIGHT PHASE  PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	HDW/FUNC 3/1R 3/1R 3/1R 3/1R 3/1R 3/1R	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 3/1R 3/1R 3/1R 3/1R
THIRD THO, DILL THE	-/		

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AFT MCA #1 PART NUMBER: J2-12; J2-57

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE THE VALVE. LOSS OF ALL REDUNDANCY MAY CAUSE THE INABILITY TO ISOLATE A LEAK WHICH MAY LEAD TO LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: ABORT: 3/3 MDAC ID: 12222 3/3

ITEM: DIODE - MANUAL CLOSE/OPEN INHIBIT

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- CONTROLS 2)
- PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 2, L/R OX & FU ISOL VLVS
- 5) DIODE - MANUAL CLOSE/OPEN INHIBIT
- 6)
- 7)
- 8)

9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		-, -

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #1 PART NUMBER: J2-11; J2-47

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE "POWER OFF" INHIBIT TO THE OPEN RELAY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12223 ABORT: 2/1R

ITEM: DIODE - MANUAL CLOSE/OPEN INHIBIT

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 2, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL CLOSE/OPEN INHIBIT

6)

7)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AFT MCA #1
PART NUMBER: J2-11; J2-47

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

IF THE VALVE WAS OPENED WITH THE GPC, LOSE CAPABILITY TO RE-OPEN THE VALVE. MANUAL SWITCH PROVIDES REDUNDANCY. LOSS OF ALL REDUNDANCY MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT TO MEET LANDING WEIGHT CONSTRAINTS AND/OR C.G. SAFETY MARGINS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12224 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (OPEN CIRCUIT)

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 3, L/R OX & FU ISOL VLVS
- 5) DIODE LIMIT SWITCH (OPEN CIRCUIT)

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	3: 3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #3

PART NUMBER: J2-79, 89; CR38

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE LOGIC TALKBACK TO TURN MOTOR OFF. MOTOR CAN WITHSTAND CONTINUOUS POWER. VALVE MOVEMENT OPEN AND CLOSE STILL OPERABLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12225 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (OPEN CIRCUIT)

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 3, L/R OX & FU ISOL VLVS
- 5) DIODE LIMIT SWITCH (OPEN CIRCUIT)

6)

7) 8)

9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #3

PART NUMBER: J2-79, 89; CR38

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE ISOLATION BETWEEN MANUAL CLOSE AND SWITCH

TALKBACK DISPLAY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12226 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (CLOSE CIRCUIT)

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 3, L/R OX & FU ISOL VLVS
- 5) DIODE LIMIT SWITCH (CLOSE CIRCUIT)

6)

7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #3

PART NUMBER: J2-80, 90; CR31

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE TALKBACK LOGIC TO TURN MOTOR OFF. MOTOR CAN WITHSTAND CONTINUOUS POWER. VALVE MOVEMENT OPEN AND CLOSE STILL OPERABLE.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: ARCS MDAC ID: 12227

DIODE - LIMIT SWITCH (CLOSE CIRCUIT) ITEM:

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 3, L/R OX & FU ISOL VLVS
- 5) DIODE LIMIT SWITCH (CLOSE CIRCUIT)

6)

7) 8)

9)

### CRITICALITIES

ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 3/3 3/3 3/3 3/3
	RTLS: TAL: AOA:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #3

PART NUMBER: J2-80, 90; CR31

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE ISOLATION BETWEEN MANUAL OPEN AND SWITCH TALKBACK DISPLAY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12228 ABORT: 3/1R

ITEM: DIODE - GPC CLOSE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) LECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 3, L/R OX & FU ISOL VLVS
- 5) DIODE - GPC CLOSE
- 6)
- 7)
- 8) 9)

CRITICALITIES

DW/FUNC	ABORT	HDW/FUNC
3/1R	RTLS:	3/1R
3/1R	TAL:	3/1R
3/1R		3/1R
•		3/1R 3/1R
3/1R	AIO.	3/ IR
	3/1R 3/1R 3/1R 3/1R	3/1R RTLS: 3/1R TAL: 3/1R AOA: 3/1R ATO:

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AFT MCA #3

PART NUMBER: J2-20, J2-71; CR37, CR36

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

LOSE GPC COMMAND TO CLOSE THE VALVE. MANUAL COMMANDING AND SECOND GPC COMMAND STILL AVAILABLE. LOSS OF ALL REDUNDANCY MAY CAUSE THE INABILITY ISOLATE A LEAK, WHICH MAY LEAD TO LOSS OF CREW/VEHICLE.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: ARCS MDAC ID: 12229

ITEM: DIODE - GPC CLOSE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
  3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 3, L/R OX & FU ISOL VLVS

5) DIODE - GPC CLOSE

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #3

PART NUMBER: J2-20, J2-71; CR37, CR36

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 SUBSYSTEM: ARCS HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/1R MDAC ID: 12230 ABORT: 2/1R

ITEM: DIODE - GPC OPEN

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 3, L/R OX & FU ISOL VLVS
- 5) DIODE GPC OPEN

6)

7)

8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		7, 221

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AFT MCA #3 PART NUMBER: J2-21; CR32

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE GPC COMMAND TO OPEN THE VALVE. MANUAL COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY TO OPEN THE VALVE MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS

FLIGHT: 3/1R ABORT: 2/1R

MDAC ID: 12232

ITEM: DIODE - MANUAL OPEN

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 3, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL OPEN

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC PRELAUNCH: 3/3 RTLS: 2/1R LIFTOFF: 3/3 TAL: 2/1R DHORBIT: 3/2R AUA: 3/2R

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AFT MCA #3

PART NUMBER: J2-57; CR28

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE MANUAL COMMAND TO OPEN THE VALVE. GPC COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12233 ABORT: 3/3

ITEM: DIODE - MANUAL OPEN

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 3, L/R OX & FU ISOL VLVS 5) DIODE MANUAL OPEN

6)

7)

8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		٠,٠

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #3 PART NUMBER: J2-57; CR28

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE: 2/26/88 E-496

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R ABORT: 3/1R SUBSYSTEM: ARCS MDAC ID: 12234

DIODE - MANUAL CLOSE ITEM:

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
  4) MANIFOLD 3, L/R OX & FU ISOL VLVS

5) DIODE - MANUAL CLOSE

6)

7)

8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AFT MCA #3 PART NUMBER: J2-22; CR41

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE MANUAL COMMAND TO CLOSE THE VALVE. GPC COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY MAY CAUSE THE INABILITY TO ISOLATE A THRUSTER LEAK WHICH MAY LEAD TO LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 3/3

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12235 ABORT: 3/3

ITEM: DIODE - MANUAL CLOSE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 3, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL CLOSE

6)

7)

8) 9)

### CRITICALITIES

ABORT	HDW/FUNC
RTLS:	3/3
TAL:	3/3
AOA:	3/3
ATO:	3/3
	·
	RTLS: TAL: AOA:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #3
PART NUMBER: J2-22; CR41

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12236 ABORT: 3/3

ITEM: DIODE - MANUAL OPEN/CLOSE INHIBIT

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 3, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL OPEN/CLOSE INHIBIT

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #3
PART NUMBER: J2-57; CR27

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE "POWER OFF" INHIBIT TO THE CLOSE RELAYS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12237 ABORT: 3/1R

ITEM: DIODE - MANUAL OPEN/CLOSE INHIBIT

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 3, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL OPEN/CLOSE INHIBIT
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/1R		,

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AFT MCA #3
PART NUMBER: J2-57; CR27

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE THE VALVES. LOSS OF ALL REDUNDANCY MAY CAUSE THE INABILITY TO ISOLATE A LEAK WHICH MAY LEAD TO LOSS OF CREW/VEHICLE.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE : 2/26/88 E-500

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: ARCS MDAC ID: 12238

DIODE - MANUAL CLOSE/OPEN INHIBIT ITEM:

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
  4) MANIFOLD 3, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL CLOSE/OPEN INHIBIT

6)

7)

8) 9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #3 PART NUMBER: J2-22; CR42

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE "POWER OFF" INHIBIT TO THE OPEN RELAY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12239 ABORT: 2/1R

ITEM: DIODE - MANUAL CLOSE/OPEN INHIBIT

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 3, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL CLOSE/OPEN INHIBIT
- 6) 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		,

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AFT MCA #3
PART NUMBER: J2-22; CR42

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

IF THE VALVE WAS OPENED WITH THE GPC, LOSE CAPABILITY TO RE-OPEN THE VALVE. MANUAL SWITCH PROVIDES REDUNDANCY. LOSS OF ALL REDUNDANCY MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT TO MEET LANDING WEIGHT CONSTRAINTS AND/OR C.G. SAFETY MARGINS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE: 2/26/88 E-502

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE: FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: ARCS ABORT:

MDAC ID: 12240

DIODE - LIMIT SWITCH (OPEN CIRCUIT) ITEM:

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, L/R OX & FU ISOL VLVS
- 5) DIODE LIMIT SWITCH (OPEN CIRCUIT)

6)

7) 8) 9)

CRITICALITIES

CRITICALITIES		
HDW/FUNC 3/3 3/3 3/3 3/3 3/3	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 3/3 3/3 3/3 3/3
	HDW/FUNC 3/3 3/3 3/3 3/3	#DW/FUNC ABORT RTLS:  3/3 RTLS:  3/3 TAL:  3/3 AOA:  3/3 ATO:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #3 PART NUMBER: J3-84, 68; CR25

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE: LOSE LOGIC TALKBACK TO TURN MOTOR OFF. MOTOR CAN WITHSTAND CONTINUOUS POWER. VALVE MOVEMENT OPEN AND CLOSE STILL OPERABLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12241 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (OPEN CIRCUIT)

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, L/R OX & FU ISOL VLVS
- 5) DIODE LIMIT SWITCH (OPEN CIRCUIT)
- 6)
- 7)
- 8) 9)

### CRITICALITIES

	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #3

PART NUMBER: J3-84, 68; CR25

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

NO EFFECT. LOSE ISOLATION BETWEEN MANUAL CLOSE AND SWITCH TALKBACK DISPLAY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12242 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (CLOSE CIRCUIT)

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, L/R OX & FU ISOL VLVS
- 5) DIODE LIMIT SWITCH (CLOSE CIRCUIT)

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:			

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #3

PART NUMBER: J3-85, 60; CR95

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE TALKBACK LOGIC TO TURN MOTOR OFF. MOTOR CAN WITHSTAND CONTINUOUS POWER. VALVE MOVEMENT OPEN AND CLOSE STILL OPERABLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12243 ABORT: 3/3

ITEM: DIODE - LIMIT SWITCH (CLOSE CIRCUIT)

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, L/R OX & FU ISOL VLVS
- 5) DIODE LIMIT SWITCH (CLOSE CIRCUIT)
- 6)
- 7)
- 8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		-/ <b>-</b>

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #3

PART NUMBER: J3-85, 60; C495

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

NO EFFECT. LOSE ISOLATION BETWEEN MANUAL OPEN AND SWITCH TALKBACK DISPLAY.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R ABORT: 3/1R SUBSYSTEM: ARCS MDAC ID: 12244

ITEM: DIODE - GPC CLOSE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
  3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, L/R OX & FU ISOL VLVS

5) DIODE - GPC CLOSE

6)

7)

8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	: 3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AFT MCA #3

PART NUMBER: J1-113, J3-64; CR34, CR35

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE GPC COMMAND TO CLOSE THE VALVE. MANUAL COMMANDING AND SECOND GPC COMMAND STILL AVAILABLE. LOSS OF ALL REDUNDANCY MAY CAUSE THE INABILITY ISOLATE A THRUSTER LEAK, WHICH MAY LEAD TO LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12245 ABORT: 3/3

ITEM: DIODE - GPC CLOSE

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, L/R OX & FU ISOL VLVS
- 5) DIODE GPC CLOSE
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		-, -

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #3

PART NUMBER: J1-113, J3-64; CR34, CR35

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE

SYSTEMS HANDBOOK

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R ABORT: 2/1R SUBSYSTEM: ARCS MDAC ID: 12246

ITEM: DIODE - GPC OPEN

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, L/R OX & FU ISOL VLVS 5) DIODE GPC OPEN

6)

7)

8) 9)

### CRITICALITIES

ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 2/1R 2/1R 3/3 3/2R
	RTLS: TAL: AOA:

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AFT MCA #3 PART NUMBER: J1-56; CR96

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE GPC COMMAND TO OPEN THE VALVE. MANUAL COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY TO OPEN THE VALVE MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

DATE:

10/01/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS

FLIGHT:

3/3

MDAC ID:

12247

ABORT:

3/3

ITEM:

DIODE - GPC OPEN

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, L/R OX & FU ISOL VLVS
- 5) DIODE - GPC OPEN

6)

7)

8) 9)

CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/3	RTLS:	3/3
3/3	TAL:	3/3
3/3	AOA:	3/3
3/3	ATO:	3/3
3/3		-, -
	3/3 3/3 3/3 3/3	3/3 RTLS: 3/3 TAL: 3/3 AOA: 3/3 ATO:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

AFT MCA #3 PART NUMBER: J1-56; CR96

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

HIGHEST CRITICALITY HDW/FUNC 10/01/87

FLIGHT: 3/1R ABORT: 2/1R DATE: SUBSYSTEM: ARCS MDAC ID: 12248

DIODE - MANUAL OPEN ITEM:

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL OPEN
- 6)
- 7)
- 8) 9)

# CRITICALITIES

	CRITICA	LITIES	
FLIGHT PHASE PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	HDW/FUNC 3/3 3/3 3/2R 3/1R 3/3	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 2/1R 2/1R 3/3 3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: AFT MCA #3 PART NUMBER: J3-57; C4110

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

LOSE MANUAL COMMAND TO OPEN THE VALVE. GPC COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY MAY CAUSE INABILITY TO EXPEL ENOUGH PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

DATE: 10/01/87
SUBSYSTEM: ARCS
HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12249 ABORT: 3/3

ITEM: DIODE - MANUAL OPEN

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL OPEN
- 6)
- 7)
- 8) 9)

### CRITICALITIES

ETTAMM DIES	CRITICALITIES		
FLIGHT PHASE PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	HDW/FUNC 3/3 3/3 3/3 3/3 3/3	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 3/3 3/3 3/3 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #3
PART NUMBER: J3-57; C4110

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R ABORT: 3/1R MDAC ID: 12250

ITEM: DIODE - MANUAL CLOSE

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL CLOSE
- 6)
- 7)
- 8) 9)

### CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/1R	RTLS:	3/1R
3/1R	TAL:	3/1R
3/1R	AOA:	3/1R
3/1R	ATO:	3/1R
3/1R		·
	3/1R 3/1R 3/1R	3/1R RTLS: 3/1R TAL: 3/1R AOA: 3/1R ATO:

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: AFT MCA #3 PART NUMBER: J3-68; CR30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE MANUAL COMMAND TO CLOSE THE VALVE. GPC COMMANDING STILL AVAILABLE. LOSS OF ALL REDUNDANCY MAY CAUSE THE INABILITY TO ISOLATE A THRUSTER LEAK WHICH MAY LEAD TO LOSS OF CREW/VEHICLE.

HIGHEST CRITICALITY HDW/FUNC

DATE: 10/01/87
SUBSYSTEM: ARCS FLIGHT: 3/3 3/3 12251 ABORT: MDAC ID:

DIODE - MANUAL CLOSE ITEM:

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL CLOSE
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #3 PART NUMBER: J3-68; CR30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE

SYSTEMS HANDBOOK

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12252 ABORT: 3/3

ITEM: DIODE - MANUAL OPEN/CLOSE INHIBIT

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL OPEN/CLOSE INHIBIT
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #3
PART NUMBER: J3-57; CR109

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE "POWER OFF" INHIBIT TO THE CLOSE RELAYS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12253 ABORT: 3/1R

ITEM: DIODE - MANUAL OPEN/CLOSE INHIBIT

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL OPEN/CLOSE INHIBIT

6)

7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	: 3/1R		·

P REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ ]

LOCATION: AFT MCA #3
PART NUMBER: J3-57; CR109

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE CAPABILITY TO CLOSE THE VALVE. LOSS OF ALL REDUNDANCY MAY CAUSE THE INABILITY TO ISOLATE A LEAK WHICH MAY LEAD TO LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12254 ABORT: 3/3

ITEM: DIODE - MANUAL CLOSE/OPEN INHIBIT

FAILURE MODE: FAILS OPEN

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL CLOSE/OPEN INHIBIT

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AFT MCA #3
PART NUMBER: J3-68; CR30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. LOSE "POWER OFF" INHIBIT TO THE OPEN RELAY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12255 ABORT: 2/1R

ITEM: DIODE - MANUAL CLOSE/OPEN INHIBIT

FAILURE MODE: FAILS SHORT

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEM
- 4) MANIFOLD 4, L/R OX & FU ISOL VLVS
- 5) DIODE MANUAL CLOSE/OPEN INHIBIT
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	•		-

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AFT MCA #3
PART NUMBER: J3-68; CR30

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

IF THE VALVE WAS OPENED WITH THE GPC, LOSE CAPABILITY TO RE-OPEN THE VALVE. MANUAL SWITCH PROVIDES REDUNDANCY. LOSS OF ALL REDUNDANCY MAY CAUSE THE INABILITY TO EXPEL ENOUGH PROPELLANT TO MEET LANDING WEIGHT CONSTRAINTS AND/OR C.G. SAFETY MARGINS.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 2/2 SUBSYSTEM: ARCS 2/1R ABORT: MDAC ID: 12256

RJDA1B L1/L5/R1 MANIFOLD LOGIC SWITCH 3 ITEM:

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
  4) MANIFOLD L1/L5/R1, RJDA1B
- 5) RJDA1B L1/L5/R1 MANIFOLD LOGIC SWITCH 3

6)

7) 8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	2/2	AOA:	3/1R
DEORBIT:	3/1R	ATO:	2/2
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 015 S3 PART NUMBER: 33V73A15S3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE ELECTRONIC AND BITE POWER AND CAUSES INABILITY TO INHIBIT DRIVER POWER FOR MANIFOLD 1 AND LEFTVERNIER. THIS CAUSES LOSS OF MANIFOLD 1 JETS AND LEFT VERNIER JETS. REDUNDANCY PROVIDED BY JETS ON MANIFOLDS 2, 3, AND 4. NO VERNIER REDUNDANCY EXISTS. THIS MAY CAUSE LOSS OF MISSION OBJECTIVES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12257 ABORT: 3/3

ITEM: RJDA1B L1/L5/R1 MANIFOLD LOGIC SWITCH 3

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L1/L5/R1, RJDA1B
- 5) RJDA1B L1/L5/R1 MANIFOLD LOGIC SWITCH 3

6) 7)

8) 9)

CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/3	RTLS:	3/3
3/3	TAL:	3/3
3/3	AOA:	3/3
3/3	ATO:	3/3
3/3		•
	3/3 3/3 3/3 3/3	3/3 RTLS: 3/3 TAL: 3/3 AOA: 3/3 ATO:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 015 S3 PART NUMBER: 33V73A15S3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH FAILED SHORT ALONE HAS NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/3

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12258 ABORT: 3/3

ITEM: RJDA1B L1/L5/R1 MANIFOLD LOGIC SWITCH 3

FAILURE MODE: SWITCH FAILS SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L1/L5/R1, RJDA1B
- 5) RJDA1B L1/L5/R1 MANIFOLD LOGIC SWITCH 3

6)

7) 8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 015 S3 PART NUMBER: 33V73A15S3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH FAILED SHORT ALONE HAS NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12259 2/1R ABORT:

ITEM: RJDA1B L1/L5/R1 MANIFOLD LOGIC SWITCH 3

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L1/L5/R1, RJDA1B
- 5) RJDA1B L1/L5/R1 MANIFOLD LOGIC SWITCH 3

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/3	TAL:	2/1R
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/1R	ATO:	3/3
LANDING/SAFING:	3/3		-, -

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 015 S3 PART NUMBER: 33V73A15S3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

DURING RE-ENTRY, LOSE MANIFOLD 1 JET IF SWITCH INADVERTENTLY SWITCHED OFF. REDUNDANCY PROVIDED BY MANIFOLD 3 JETS. LOSS OF ALL REDUNDANCY CAUSES LOSS OF CONTROL OF THE VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 2/2
MDAC ID: 12260 ABORT: 2/1R

ITEM: RJDA1B L1/L5/R1 MANIFOLD LOGIC SWITCH 3

FAILURE MODE: SWITCH FAILS SHORT TO CASE OR POLE TO POLE (WORST

CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L1/L5/R1, RJDA1B

5) RJDA1B L1/L5/R1 MANIFOLD LOGIC SWITCH 3

6) 7)

8) 9)

CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/3	RTLS:	2/1R
3/3	TAL:	2/1R
2/2	AOA:	3/1R
3/1R	ATO:	2/2
: 3/3		
	3/3 2/2 3/1R	3/3 RTLS: 3/3 TAL: 2/2 AOA: 3/1R ATO:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 015 S3
PART NUMBER: 33V73A15S3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

IF SWITCH SHORS TO CASE THE ASSOCIATED 1 AMP FUSE WILL BLOW.
LOSS OF CURRENT ACROSS CONTACT SET 5, 6 IS WORST CASE. THIS
CAUSES LOSS OF ONE ELECTRICAL PATH TO TURN ON ELECTRONIC, BITE,
AND DRIVER POWER FOR MANIFOLD 1 JETS AND CAUSES LOSS OF LEFT
VERNIERS. REDUNDANCY PROVIDED BY JETS ON MANIFOLDS 2, 3, AND 4.
NO REDUNDANCY FOR LEFT VERNIER. THIS MAY CAUSE LOSS OF MISSION
OBJECTIVES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12261 ABORT: 1/1

ITEM: RJDA1B L1/R1 MANIFOLD DRIVER SWITCH 4

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L1/R1, RJDA1B
- 5) RJDA1B L1/R1 MANIFOLD DRIVER SWITCH 4

6) 7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2	RTLS:	1/1
LIFTOFF:	3/3	TAL:	1/1
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		,

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 015 S4
PART NUMBER: 33V73A15S4

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO TURN ON MANIFOLD 1 DRIVER POWER. THIS CAUSES LOSS OF JETS ON MANIFOLD 1. REDUNDANCY PROVIDED BY JETS ON MANIFOLDS 2, 3, AND 4. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY. DURING RTLS/TAL, JETS ARE REQUIRED TO EXPEL PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE: FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: ARCS MDAC ID: 12262

RJDA1B L1/R1 MANIFOLD DRIVER SWITCH 4 ITEM:

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
  4) MANIFOLD L1/R1, RJDA1B
- 5) RJDA1B L1/R1 MANIFOLD DRIVER SWITCH 4

6)

7) 8)

9)

CRITICALITIES

	C1/T T T C		
FLIGHT PHASE  PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	HDW/FUNC 3/3 3/3 3/3 3/3	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 3/3 3/3 3/33 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 015 S4 PART NUMBER: 33V73A15S4

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH INADVERTENTLY OPERATING ALONE HAS NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12263 ABORT: 3/3

ITEM: RJDA1B L1/R1 MANIFOLD DRIVER SWITCH 4

FAILURE MODE: SWITCH SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L1/R1, RJDA1B
- RJDA1B L1/R1 MANIFOLD DRIVER SWITCH 4

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		3/3

B REDUNDANCY SCREENS: A [ ] [ ] C [ ]

LOCATION: PNL 015 S4 PART NUMBER: 33V73A15S4

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH INADVERTENTLY OPERATING ALONE HAS NO EFFECT.

REFERENCES: VS70-943099 REV B EO B12, CP; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PG 11.10, RCS SIG 2

REPORT DATE : 2/26/88 E-526

10/01/87 DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS MDAC ID: 12264 FLIGHT: 3/1R 1/1 ABORT:

ITEM:

RJDA1B L1/R1 MANIFOLD DRIVER SWITCH 4

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L1/R1, RJDA1B

5) RJDA1B L1/R1 MANIFOLD DRIVER SWITCH 4

6) 7)

8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/2	RTLS:	1/1
LIFTOFF:	3/3	TAL:	1/1
ONORBIT:	3/3	AOA:	3/3
<b></b>	3/1R	ATO:	3/3
DEORBIT:	•		-, -
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 015 S4 PART NUMBER: 33V73A15S4

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE: DURING RE-ENTRY, MANIFOLD 1 JETS ARE USED FOR VEHICLE CONTROL. REDUNDANCY PROVIDED BY MANIFOLD 3 JETS. LOSS OF ALL REDUNDANCY MAY CAUSE LOSS OF CONTROL OF THE VEHICLE. DURING RTLS/TAL, JETS ARE REQUIRED TO EXPEL PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

DATE:

10/01/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS

MDAC ID: 12265

FLIGHT: 3/1R ABORT:

1/1

ITEM:

RJDA1B L1/R1 MANIFOLD DRIVER SWITCH 4

FAILURE MODE: SWITCH FAILS SHORT TO CASE OR POLE TO POLE (WORST

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L1/R1, RJDA1B

5) RJDA1B L1/R1 MANIFOLD DRIVER SWITCH 4

6) 7)

8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/3	TAL:	1/1
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:			5/ ZI

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 015 S4 PART NUMBER: 33V73A15S4

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

IF SWITCH SHORTS TO CASE, THE ASSOCIATED FUSE (1 AMP OR 2 AMP) WILL BLOW. THEREFORE, LOSE ONE PATH FOR DRIVER POWER REDUNDANCY PROVIDED WITH OTHER CONTACT SET ON SWITCH. LOSS OF THIS REDUNDANCY CAUSE LOSS OF MANIFOLD 1 JETS. JET REDUNDANCY PROVIDED WITH MANIFOLDS 2, 3, AND 4. LOSS OF ALL REDUNDANCY MAY CAUSE LOSS OF CONTROL OF VEHICLE DURING RE-ENTRY. DURING RTLS/TAL, JETS ARE REQUIRED TO EXPEL PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

REFERENCES: VS70-943099 REV B EO B12, CP; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PG 11.10, RCS SIG 2

**REPORT DATE: 2/26/88** 

E-528

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12266 ABORT: 2/1R

ITEM: RJDA1A L2/R2 MANIFOLD LOGIC SWITCH 3

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L2/R2, RJDA1A
- 5) RJDA1A L2/R2 MANIFOLD LOGIC SWITCH 3

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### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING	: 3/3		-

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 014 S3 PART NUMBER: 33V73A14S3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE ELECTRONIC AND BITE POWER AND CAUSES INABILITY TO INHIBIT DRIVER POWER. THIS CAUSES A LOSS OF JETS ON MANIFOLD 2. REDUNDANCY PROVIDED BY JETS ON MANIFOLDS 1, 3, AND 4. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY CONTROL.

10/01/87 HIGHEST CRITICALITY HDW/FUNC DATE:

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12267 ABORT: 3/3

ITEM: RJDA1A L2/R2 MANIFOLD LOGIC SWITCH 3

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L2/R2, RJDA1A
- 5) RJDA1A L2/R2 MANIFOLD LOGIC SWITCH 3

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7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 014 S3 PART NUMBER: 33V73A14S3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH FAILED SHORT ALONE HAS NO EFFECT.

REFERENCES: VS70-943099 REV B EO B12, CP; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PG 11.10, RCS SIG 2

REPORT DATE: 2/26/88 E-530

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

FLIGHT: 3/3 SUBSYSTEM: ARCS 3/3 ABORT: MDAC ID: 12268

RJDA1A L2/R2 MANIFOLD LOGIC SWITCH 3 ITEM:

FAILURE MODE: SWITCH FAILS SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L2/R2, RJDA1A 5) RJDA1A L2/R2 MANIFOLD LOGIC SWITCH 3

6) 7)

8)

9)

### CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC	
3/3	RTLS:	3/3	
3/3	TAL:	3/3	
3/3	AOA:	3/3	
3/3	ATO:	3/3	
3/3		•	
	3/3 3/3 3/3 3/3	3/3 RTLS: 3/3 TAL: 3/3 AOA: 3/3 ATO:	

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 014 S3 PART NUMBER: 33V73A14S3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH FAILED SHORT ALONE HAS NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12269 ABORT: 2/1R

ITEM: RJDA1A L2/R2 MANIFOLD LOGIC SWITCH 3

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L2/R2, RJDA1A
- 5) RJDA1A L2/R2 MANIFOLD LOGIC SWITCH 3
- 6) 7)
- 8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/1R	ATO:	3/3
LANDING/SAFING:	3/3		-

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 014 S3
PART NUMBER: 33V73A14S3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

IF SWITCH INADVERTENTLY SWITCHED OFF DURING ASCENT, LOSE CAPABILITY TO FIRE MANIFOLD 2 JETS. REDUNDANCY PROVIDED BY JETS ON MANIFOLD 3 AND 4. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION.

REFERENCES: VS70-943099 REV B EO B12, CP; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PG 11.10, RCS SIG 2

REPORT DATE: 2/26/88 E-532

10/01/87 DATE:

HIGHEST CRITICALITY HDW/FUNC

FLIGHT: 3/1R SUBSYSTEM: ARCS MDAC ID: 12270

2/1R ABORT:

RJDA1A L2/R2 MANIFOLD LOGIC SWITCH 3 ITEM:

FAILURE MODE: SWITCH FAILS SHORT TO CASE OR POLE TO POLE (WORST

CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L2/R2, RJDA1A

5) RJDA1A L2/R2 MANIFOLD LOGIC SWITCH 3

6) 7)

8) 9)

#### CRITICALITIES

PRELAUNCH: LIFTOFF:	HDW/FUNC 3/3 3/1R 3/2R	ABORT RTLS: TAL: AOA:	HDW/FUNC 2/1R 2/1R 3/1R
ONORBIT: DEORBIT: LANDING/SAFING:	3/1R	ATO:	3/2R

LANDING/SATING: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 014 S3 PART NUMBER: 33V73A14S3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

IF SWITCH SHORTS TO CASE, IT WILL BLOW THE ASSOCIATED 1 AMP FUSE. THEREFORE, LOSE 1 PATH FOR ELECTRONIC, BITE AND/OR DRIVER POWER. REDUNDANCY PROVIDED WITH OTHER CONTACT SET ON SWITCH. LOSS OF THIS REDUNDANCY CAUSES LOSS OF MANIFOLD 2 JETS. JET REDUNDANCY PROVIDED WITH MANIFOLD 1, 3, AND 4. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12271 ABORT: 1/1

ITEM: RJDA1A L2/R2 MANIFOLD DRIVER SWITCH 4

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L2/R2, RJDA1A
- 5) RJDA1A L2/R2 MANIFOLD DRIVER SWITCH 4

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:			J/ 210

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 014 S4
PART NUMBER: 33V73A14S4

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO TURN ON DRIVER POWER. THIS CAUSES LOSS OF JETS ON MANIFOLD 2. REDUNDANCY PROVIDED BY JETS ON MANIFOLDS 1, 3, AND 4. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY. FAILURE DURING RTLS/TAL MAY PREVENT ENOUGH PROPELLANT TO BE EXPELLED TO MEET LANDING WEIGHT CONSTRAINTS.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: ARCS MDAC ID: 12272

RJDA1A L2/R2 MANIFOLD DRIVER SWITCH 4 ITEM:

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L2/R2, RJDA1A 5) RJDA1A L2/R2 MANIFOLD DRIVER SWITCH 4
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 014 S4 PART NUMBER: 33V73A14S4

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH FAILED SHORT ALONE HAS NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12273 ABORT: 3/3

ITEM: RJDA1A L2/R2 MANIFOLD DRIVER SWITCH 4

FAILURE MODE: SWITCH FAILS SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L2/R2, RJDA1A
- 5) RJDA1A L2/R2 MANIFOLD DRIVER SWITCH 4

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 014 S4
PART NUMBER: 33V73A14S4

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH INADVERTENTLY OPERATING ALONE HAS NO EFFECT.

REFERENCES: VS70-943099 REV B EO B12, CP; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PG 11.10, RCS SIG 2

REPORT DATE: 2/26/88 E-536

10/01/87 DATE:

HIGHEST CRITICALITY HDW/FUNC

FLIGHT: 3/1R SUBSYSTEM: ARCS 1/1 ABORT: MDAC ID: 12274

RJDA1A L2/R2 MANIFOLD DRIVER SWITCH 4 ITEM:

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L2/R2, RJDA1A
- 5) RJDA1A L2/R2 MANIFOLD DRIVER SWITCH 4

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
	3/3	AOA:	3/3
ONORBIT:	-/ -	ATO:	3/3
DEORBIT:	3/1R	AIO.	٠,٠
TANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 014 S4 PART NUMBER: 33V73A14S4

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

DURING ASCENT, LOSE CAPABILITY TO FIRE MANIFOLD 2 JETS. REDUNDANCY PROVIDED BY JETS ON MANIFOLD 3 AND 4. LOSS OF ALL REDUNDACY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION. FAILURE DURING RTLS/TAL MAY PREVENT ENOUGH PROPELLANT TO BE EXPELLED TO MEET LANDING WEIGHT CONSTRAINT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12275 ABORT: 1/1

ITEM: RJDA1A L2/R2 MANIFOLD DRIVER SWITCH 4

FAILURE MODE: SWITCH FAILS SHORT TO CASE OR POLE TO POLE (WORST

CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L2/R2, RJDA1A
- RJDA1A L2/R2 MANIFOLD DRIVER SWITCH 4

6)

7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	1/1	
LIFTOFF:	3/1R	TAL:	1/1	
ONORBIT:	3/2R	AOA:	3/1R	
DEORBIT:	3/1R	ATO:	3/2R	
LANDING/SAFING:	3/3		,	

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 014 S4 PART NUMBER: 33V73A14S4

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

IF SWITCH SHORTS TO CASE, IT WILL BLOW THE ASSOCIATED FUSE (1 AMP OR 2 AMP). THEREFORE, LOSS 1 PATH FOR DRIVER POWER. REDUNDANCY PROVIDED WITH OTHER CONTACT SET ON SWITCH. LOSS OF THIS REDUNDANCY CAUSES LOSS OF MANIFOLD 2 JETS. JET REDUNDANCY PROVIDED WITH MANIFOLDS 1, 3, AND 4. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY. FAILURE DURING RTLS/TAL MAY PREVENT ENOUGH PROPELLANT TO BE EXPELLED TO MEET LANDING WEIGHT CONSTRAINTS.

REFERENCES: VS70-943099 REV B EO B12, CP; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PG 11.10, RCS SIG 2

REPORT DATE : 2/26/88 E-538

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 2/2
MDAC ID: 12276 ABORT: 2/1R

ITEM: RJDA2B L3/R3/R5 MANIFOLD LOGIC SWITCH 3

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L3/R3/R5, RJDA2B
- 5) RJDA2B L3/R3/R5 MANIFOLD LOGIC SWITCH 3

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#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	2/2	AOA:	3/1R
DEORBIT:	3/1R	ATO:	2/2
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 016 S3 PART NUMBER: 33V73A16S3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE ELECTRONIC AND BITE POWER AND CAUSES INABILITY TO INHIBIT DRIVER POWER FOR MANIFOLD 3 AND RIGHT VERNIER. THIS CAUSES LOSS OF MANIFOLD 1 JETS AND RIGHT VERNIER JETS. REDUNDANCY PROVIDED BY JETS ON MANIFOLDS 1, 2, AND 4. NO REDUNDANCY FOR VERNIER JETS. THIS MAY CAUSE LOSS OF MISSION OBJECTIVES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12277 ABORT: 3/3

ITEM: RJDA2B L3/R3/R5 MANIFOLD LOGIC SWITCH 3

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L3/R3/R5, RJDA2B
- 5) RJDA2B L3/R3/R5 MANIFOLD LOGIC SWITCH 3

6) 7)

7)

8) 9)

#### CRITICALITIES

FLIGH PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 016 S3 PART NUMBER: 33V73A16S3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH FAILED SHORT ALONE HAS NO EFFECT.

REFERENCES: VS70-943099 REV B EO B12, CP; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PG 11.10, RCS SIG 2

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12278 ABORT: 3/3

ITEM: RJDA2B L3/R3/R5 MANIFOLD LOGIC SWITCH 3

FAILURE MODE: SWITCH FAILS SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L3/R3/R5, RJDA2B
- 5) RJDA2B L3/R3/R5 MANIFOLD LOGIC SWITCH 3

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 016 S3
PART NUMBER: 33V73A16S3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH FAILED SHORT ALONE HAS NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12279 ABORT: 2/1R

ITEM: RJDA2B L3/R3/R5 MANIFOLD LOGIC SWITCH 3

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L3/R3/R5, RJDA2B
- 5) RJDA2B L3/R3/R5 MANIFOLD LOGIC SWITCH 3

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8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/3	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/3
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 016 S3 PART NUMBER: 33V73A16S3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE JETS ON MANIFOLD 3. REDUNDANCY PROVIDED BY JETS ON MANIFOLD 1, 2, AND 4. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 2/2 SUBSYSTEM: ARCS 2/1R ABORT: 12280 MDAC ID:

RJDA2B L3/R3/R5 MANIFOLD LOGIC SWITCH 3

FAILURE MODE: SWITCH FAILS SHORT TO CASE OR POLE TO POLE (WORST

CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L3/R3/R5, RJDA2B
- RJDA2B L3/R3/R5 MANIFOLD LOGIC SWITCH 3

6) 7)

8) 9)

## CRITICALITIES

	CRITICALITIES		
FLIGHT PHASE PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	HDW/FUNC 3/3 3/1R 2/2 3/1R 3/3	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 2/1R 2/1R 3/1R 2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 016 S3 PART NUMBER: 33V73A16S3

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

IF SWITCH SHORTS TO CASE, THE ASSOCIATED 1 AMP FUSE WILL BLOW. THIS CAUSES LOSS OF ONE ELECTRICAL PATH TO TURN ON ELECTRONIC, BITE, AND DRIVER POWER FOR MANIFOLD 3 JETS AND CAUSES LOSS OF RIGHT VERNIERS. REDUNDANCY PROVIDED BY JETS ON MANIFOLDS 1, 2, AND 4. NO REDUNDANCY PROVIDE FOR VERNIER JETS. THIS MAY CAUSE LOSS OF MISSION OBJECTIVES.

REFERENCES: VS70-943099 REV B EO B12, CP; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PG 11.10, RCS SIG 2

E-543 REPORT DATE: 2/26/88

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS

FLIGHT: 3/1R MDAC ID: 12281 ABORT: 1/1

ITEM: RJDA2B L3/R3 MANIFOLD DRIVER SWITCH 4

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- THRUSTER SUBSYSTEM 3)
- 4) MANIFOLD L3/R3, RJDA2B
- RJDA2B L3/R3 MANIFOLD DRIVER SWITCH 4 5)

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## CRITICALITIES

PITCUM DULA	CULTICALLIES		
FLIGHT PHASE PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	HDW/FUNC 3/3 3/1R 3/2R 3/1R 3/3	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 1/1 1/1 3/1R 3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 016 S4 PART NUMBER: 33V73A16S4

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE CAPABILITY TO TURN ON MANIFOLD 3 DRIVER POWER. THIS CAUSES LOSS OF JETS ON MANIFOLD 3. REDUNDANCY PROVIDED BY JETS ON MANIFOLDS 1, 2, AND 4. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY. DURING RTLS/TAL, JETS ARE REQUIRED TO EXPEL PROPELLANTS TO MEET LANDING WEIGHT

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/3 ABORT: 3/3 SUBSYSTEM: ARCS MDAC ID: 12282

RJDA2B L3/R3 MANIFOLD DRIVER SWITCH 4 ITEM:

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
  3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L3/R3, RJDA2B
- 5) RJDA2B L3/R3 MANIFOLD DRIVER SWITCH 4

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#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 016 S4 PART NUMBER: 33V73A16S4

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH FAILED SHORT ALONE HAS NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12283 ABORT: 3/3

ITEM: RJDA2B L3/R3 MANIFOLD DRIVER SWITCH 4

FAILURE MODE: SWITCH FAILS SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L3/R3, RJDA2B
- 5) RJDA2B L3/R3 MANIFOLD DRIVER SWITCH 4

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### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		-, -

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 016 S4
PART NUMBER: 33V73A16S4

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH INADVERTENTLY OPERATING ALONE HAS NO EFFECT.

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

FLIGHT: 3/1R SUBSYSTEM: ARCS 1/1 ABORT: 12284 MDAC ID:

RJDA2B L3/R3 MANIFOLD DRIVER SWITCH 4

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- CONTROLS 2)
- THRUSTER SUBSYSTEM
- 4) MANIFOLD L3/R3, RJDA2B
- 5) RJDA2B L3/R3 MANIFOLD DRIVER SWITCH 4

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8) 9)

CRITICALITIES

	CRITICALITIES		
FLIGHT PHASE PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	HDW/FUNC 3/3 3/1R 3/3 3/1R 3/3	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 1/1 1/1 3/1R 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 016 S4 PART NUMBER: 33V73A16S4

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE JETS ON MANIFOLD . REDUNDANCY PROVIDED BY JETS ON MANIFOLDS 1, 2, AND 4. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY. DURING RTLS/TAL, JETS ARE REQUIRED TO EXPEL PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS

FLIGHT: 3/1R MDAC ID: 12285 ABORT: 1/1

ITEM: RJDA2B L3/R3 MANIFOLD DRIVER SWITCH 4

FAILURE MODE: SWITCH FAILS SHORT TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L3/R3, RJDA2B

5) RJDA2B L3/R3 MANIFOLD DRIVER SWITCH 4

6) 7)

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## CRITICALITIES

DI Tarra	CRITICALITIES		
FLIGHT PHASE PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	HDW/FUNC 3/3 3/1R 3/2R 3/1R 3/3	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 1/1 1/1 3/1R 3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 016 S4 PART NUMBER: 33V73A16S4

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

IF SWITCH SHORTS TO CASE, THE ASSOCIATED FUSE (1 AMP OR 2 AMP) WILL BLOW. THEREFORE, LOSE ONE PATH FOR DRIVER POWER. REDUNDANCY PROVIDED WITH OTHER CONTACT SET ON SWITCH. LOSS OF THIS REDUNDANCY CAUSES LOSS OF MANIFOLD 3 JETS. JET REDUNDANCY PROVIDED WITH MANIFOLDS 1, 2, AND 4. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQURIED FOR ET SEPARATION AND RE-ENTRY DURING RTLS/TAL, JETS ARE REQUIRED TO EXPEL PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

REFERENCES: VS70-943099 REV B EO B12, CP; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PG 11.10, RCS SIG 2

10/01/87 DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS

FLIGHT: 3/1R ABORT: 2/1R

MDAC ID: 12286

ITEM:

RJDA2A L4/R4 MANIFOLD LOGIC SWITCH 5

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L4/R4, RJDA2A
- 5) RJDA2A L4/R4 MANIFOLD LOGIC SWITCH 5

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### CRITICALITIES

	CVTITON	1111111	
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
I DI 0::	3/3	RTLS:	2/1R
PRELAUNCH:	•	TAL:	2/1R
LIFTOFF:	3/1R	AOA:	3/1R
ONORBIT:	3/2R	•••	•
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING	3/3		

LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 014 S5 PART NUMBER: 33V73A14S5

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE ELECTRONIC AND BITE POWER AND CAUSES INABILITY TO INHIBIT DRIVER POWER. THIS CAUSES LOSS OF MANIFOLD 4 JETS. REDUNDANCY PROVIDED BY JETS ON MANIFOLDS 1, 2, AND 3. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS

FLIGHT: 3/3 MDAC ID: 12287 ABORT: 3/3

ITEM: RJDA2A L4/R4 MANIFOLD LOGIC SWITCH 5

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L4/R4, RJDA2A
- RJDA2A L4/R4 MANIFOLD LOGIC SWITCH 5 5)

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8) 9)

CRITICALITIES

<b></b>			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	•
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:		AIO;	3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 014 S5 PART NUMBER: 33V73A14S5

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH FAILED SHORT ALONE HAS NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12288 ABORT: 3/3

ITEM: RJDA2A L4/R4 MANIFOLD LOGIC SWITCH 5

FAILURE MODE: SWITCH FAILS SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L4/R4, RJDA2A
- 5) RJDA2A L4/R4 MANIFOLD LOGIC SWITCH 5

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7) 8)

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#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 014 S5 PART NUMBER: 33V73A14S5

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH FAILED SHORT ALONE HAS NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12289 ABORT: 2/1R

ITEM: RJDA2A L4/R4 MANIFOLD LOGIC SWITCH 5

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L4/R4, RJDA2A
- 5) RJDA2A L4/R4 MANIFOLD LOGIC SWITCH 5

6) 7)

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#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/1R	ATO:	3/3
LANDING/SAFING:	3/3		·

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 014 S5 PART NUMBER: 33V73A14S5

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

DURING ASCENT, LOSE JETS ON MANIFOLD 4. MANIFOLD 2 JETS PROVIDED REDUNDANCY FOR -Z THRUST REQUIRED FOR ET SEPARATION.

REFERENCES: VS70-943099 REV B EO B12, CP; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PG 11.10, RCS SIG 2

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12290 ABORT: 2/1R

ITEM: RJDA2A L4/R4 MANIFOLD LOGIC SWITCH 5

FAILURE MODE: SWITCH FAILS SHORT TO CASE OR POLE TO POLE (WORST

CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L4/R4, RJDA2A
- 5) RJDA2A L4/R4 MANIFOLD LOGIC SWITCH 5

6) 7)

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#### CRITICALITIES

PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT:	HDW/FUNC 3/3 3/1R 3/2R 3/1R	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 2/1R 2/1R 3/1R 3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 014 S5 PART NUMBER: 33V73A14S5

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

IF SWITCH SHORTS TO CASE, IT WILL BLOW THE ASSOCIATED 1 AMP FUSE. THIS CAUSES LOSS OF ONE ELECTRICAL PATH FOR ELECTRONIC, BITE AND/OR DRIVER POWER. REDUNDANCY PROVIDED WITH OTHER CONTACT SET ON SWITCH. LOSS OF THIS REDUNDANCY CAUSES LOSS OF MANIFOLD 4 JETS. JET REDUNDANCY PROVIDED WITH MANIFOLDS 1, 2, AND 3. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY.

REFERENCES: VS70-943099 REV B EO B12, CP; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PG 11.10, RCS SIG 2

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12291 ABORT: 1/1

ITEM: RJDA2A L4/R4 MANIFOLD DRIVER SWITCH 6

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L4/R4, RJDA2A
- 5) RJDA2A L4/R4 MANIFOLD DRIVER SWITCH 6

6) 7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		,

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 014 S6 PART NUMBER: 33V73A14S6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO TURN ON DRIVER POWER. THIS CAUSE LOSS OF JETS ON MANIFOLD 4. REDUNDANCY PROVIDED BY JETS ON MANIFOLDS 1, 2, AND 3. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY. FAILURE DURING RTLS/TAL MAY PREVENT ENOUGH PROPELLANTS TO BE EXPELLED TO MEET LANDING WEIGHT CONSTRAINTS.

REFERENCES: VS70-943099 REV B EO B12, CP; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PG 11.10, RCS SIG 2

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

DATE: 10/01/8/ FLIGHT: 3/3
SUBSYSTEM: ARCS ABORT: 3/3
MDAC ID: 12292

ITEM: RJDA2A L4/R4 MANIFOLD DRIVER SWITCH 6

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L4/R4, RJDA2A
- 5) RJDA2A L4/R4 MANIFOLD DRIVER SWITCH 6

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE  PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	HDW/FUNC 3/3 3/3 3/3 3/3 3/3	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 3/3 3/3 3/3 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 014 S6 PART NUMBER: 33V73A14S6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH FAILED SHORT ALONE HAS NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12293 ABORT: 3/3

ITEM: RJDA2A L4/R4 MANIFOLD DRIVER SWITCH 6

FAILURE MODE: SWITCH FAILS SORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICA COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L4/R4, RJDA2A
- 5) RJDA2A L4/R4 MANIFOLD DRIVER SWITCH 6

6)

7) 8)

9)

CRITICALITIES

<b></b>			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT: DEORBIT:	3/3	AOA:	3/3
	3/3	ATO:	3/3
LANDING/SAFING:	3/3		-

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL 014 S6 PART NUMBER: 33V73A14S6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SWITCH INADVERTENTLY OPERATING ALONE HAS NO EFFECT.

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

FLIGHT: 3/1R SUBSYSTEM: ARCS

1/1 ABORT: MDAC ID: 12294

RJDA2A L4/R4 MANIFOLD DRIVER SWITCH 6 ITEM:

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS

- 3) THRUSTER SUBSYSTEM
  4) MANIFOLD L4/R4, RJDA2A
  5) RJDA2A L4/R4 MANIFOLD DRIVER SWITCH 6

7) 8)

9)

#### CRITICALITIES

01/1 T 4:12			
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/1R	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 014 S6 PART NUMBER: 33V73A14S6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

DURING ASCENT, LOSE JETS ON MANIFOLD 4, JETS ON MANIFOLD 2 PROVICE -Z THRUST REDUNDANCY REQUIRED FOR ET SEPARATION. FAILURE DURING RTLS/TAL PREVENS ENOUGH PROPELLANTS TO BE EXPELLED TO MEET LANDING WEIGHT CONSTRAINTS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12295 ABORT: 1/1

ITEM: RJDA2A L4/R4 MANIFOLD DRIVER SWITCH 6

FAILURE MODE: SWITCH FAILS SHORT TO CASE OR POLE TO POLE (WORST

CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L4/R4, RJDA2A
- RJDA2A L4/R4 MANIFOLD DRIVER SWITCH 6

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		- /

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL 014 S6 PART NUMBER: 33V73A14S6

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

IF SWITCH SHORTS TO CASE, IT WILL BLOW THE ASSOCIATED FUSE (1 AMP OR 2 AMPS). THIS WILL CAUSE LOSS OF ONE ELECTRICAL PATH FOR DRIVER POWER. REDUNDANCY PROVIDED WITH OTHER CONTACT SET ON SWITCH. LOSS OF THIS REDUNDANCY CAUSES LOSS OF MANIFOLD 4 JETS. JET REDUNDANCY PROVIDED WITH MANIFOLDS 1, 2, AND 3. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY. FAILURE DURING RTLS/TAL PREVENTS ENOUGH PROPELLANT TO BE EXPELLED TO MEET LANDING WEIGHT CONSTRAINTS.

REFERENCES: VS70-943099 REV B EO B12, CP; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PG 11.10, RCS SIG 2

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12296 ABORT: 3/2R

ITEM: MANIFOLD 1, JETS HEATER CONTROL SWITCH 9

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 1, JETS
- 5) MANIFOLD 1, JETS HEATER CONTROL SWITCH 9

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE H PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	IDW/FUNC 3/3 3/3 3/2R 3/3 3/3	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 3/3 3/3 3/3 3/2R

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL A14 S9 PART NUMBER: 36V73A14S9

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

PROPELLANTS IN JETS ON MANIFOLD 1 MAY FREEZE, CAUSING LOSS OF JETS ON THE MANIFOLD. REDUNDANCY PROVIDED BY JETS ON REMAINING THREE MANIFOLDS. LOSS OF ALL REDUNDANCY MAY PREVENT ON-ORBIT OPERATIONS THUS MISSION OBJECTIVES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12297 ABORT: 3/3

ITEM: MANIFOLD 1, JETS HEATER CONTROL SWITCH 9

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 1, JETS
- 5) MANIFOLD 1, JETS HEATER CONTROL SWITCH 9

6) 7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	3/3	
LIFTOFF:	3/3	TAL:	3/3	
ONORBIT:	3/3	AOA:	3/3	
DEORBIT:	3/3	ATO:	3/3	
LANDING/SAFING:	3/3		-/ -	

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

PNL A14 S9 LOCATION: PART NUMBER: 36V73A14S9

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

NO EFFECT. REQUIRES ADDITIONAL FAILURE (THERMOSTAT) TO CAUSE OVERHEATING OF PROPELLANTS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12298 ABORT: 3/2R

ITEM: MANIFOLD 1, JETS HEATER CONTROL SWITCH 9

FAILURE MODE: SWITCH FAILS SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 1, JETS
- 5) MANIFOLD 1, JETS HEATER CONTROL SWITCH 9

6)

7) 8)

9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	3/3	
LIFTOFF:	3/3	TAL:	3/3	
ONORBIT:	3/2R	AOA:	3/3	
DEORBIT:	3/3	ATO:	3/2R	
LANDING/SAFING:	3/3		•	

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL A14 S9 PART NUMBER: 36V73A14S9

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

PROPELLANTS IN JETS ON MANIFOLD 1 MAY FREEZE CAUSING LOSS OF JETS. REDUNDANCY PROVIDED BY JETS ON REMAINING THREE MANIFOLDS. LOSS OF ALL REDUNDANCY MAY PREVENT ON-ORBIT OPERATIONS THUS MISSION OBJECTIVES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12299 ABORT: 3/3

ITEM: MANIFOLD 1, JETS HEATER CONTROL SWITCH 9

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 1, JETS
- 5) MANIFOLD 1, JETS HEATER CONTROL SWITCH 9
- 6)
- 7) 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S9 PART NUMBER: 36V73A14S9

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

REFERENCES: VS70-943099 REV B EO B12, CP; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PG 11.10, RCS SIG 2

DATE:

10/01/87

HIGHEST CRITICALITY HDW/FUNC

:a0576HSUBSYSTEM: ARCS

FLIGHT: 3/2R

MDAC ID: 12300

ABORT:

3/2R

ITEM: MANIFOLD 1, JETS HEATER CONTROL SWITCH 9

FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 1, JETS
- 5) MANIFOLD 1, JETS HEATER CONTROL SWITCH 9

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### CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/3	RTLS:	3/3
,	TAL:	3/3
,	AOA:	3/3
3/3	ATO:	3/2R
: 3/3		
	3/3 3/3 3/2R 3/3	3/3 RTLS: 3/3 TAL: 3/2R AOA: 3/3 ATO:

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ] LOCATION: PNL A14 S9

PART NUMBER: 36V73A14S9

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

SHORT TO CASE WILL BLOW 1 AMP FUSE. PROPELLANTS IN JETS ON MANIFOLD 1 MAY FREEZE CAUSING LOSS OFJETS. REDUNDANCY PROVIDED BY JETS ON REMAINING THREE MANIFOLDS. LOSS OF ALL REDUNDANCY MAY PREVENT ON-ORBIT OPERATIONS THUS MISSION OBJECTIVES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12301 ABORT: 3/2R

ITEM: MANIFOLD 2, JETS HEATER CONTROL SWITCH 10

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 2, JETS
- 5) MANIFOLD 2, JETS HEATER CONTROL SWITCH 10

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7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		J/ ZR

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL A14 S10 PART NUMBER: 36V73A14S10

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

PROPELLANTS IN JETS ON MANIFOLD 2 MAY FREEZE, CAUSING LOSS OF JETS. REDUNDANCY PROVIDED BY JETS ON REMAINING THREE MANIFOLDS. LOSS OF ALL REDUNDANCY MAY PREVENT ON-ORBIT OPERATIONS THUS MISSION OBJECTIVES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12302 ABORT: 3/3

ITEM: MANIFOLD 2, JETS HEATER CONTROL SWITCH 10

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 2, JETS
- 5) MANIFOLD 2, JETS HEATER CONTROL SWITCH 10
- 6) 7)
- 8)
- 9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S10 PART NUMBER: 36V73A14S10

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. REQUIRES ADDITIONAL FAILURE (THERMOSTAT) TO CAUSE

OVERHEATING OF PROPELLANTS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12303 ABORT: 3/2R

ITEM: MANIFOLD 2, JETS HEATER CONTROL SWITCH 10

FAILURE MODE: SWITCH FAILS SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 2, JETS
- 5) MANIFOLD 2, JETS HEATER CONTROL SWITCH 10

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#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		·

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL A14 S10 PART NUMBER: 36V73A14S10

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

PROPELLANTS IN JETS ON MANIFOLD 2 MAY FREEZE CAUSING LOSS OF JETS. REDUNDANCY PROVIDED BY JETS ON REMAINING THREE MANIFOLDS. LOSS OF ALL REUNDANCY MAY PREVENT ON-ORBIT OPERATIONS THUS MISSION OBJECTIVES.

REFERENCES: VS70-943099 REV B EO B12, CP; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK, PG 11.10, RCS SIG 2

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/3 SUBSYSTEM: ARCS 3/3 MDAC ID: 12304 ABORT:

MANIFOLD 2, JETS HEATER CONTROL SWITCH 10 ITEM:

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL CONTROL SUBSYSTEM
  4) MANIFOLD 2, JETS
- 5) MANIFOLD 2, JETS HEATER CONTROL SWITCH 10

6)

7) 8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S10 PART NUMBER: 36V73A14S10

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12305 ABORT: 3/2R

ITEM: MANIFOLD 2, JETS HEATER CONTROL SWITCH 10

FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 2, JETS
- 5) MANIFOLD 2, JETS HEATER CONTROL SWITCH 10

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## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		,

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL A14 S10 PART NUMBER: 36V73A14S10

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

SHORT TO CASE WILL BLOW 1 AMP FUSE. PROPELLANTS IN JETS ON MANIFOLD 2 MAY FREEZE CAUSING LOSS OF JETS. REDUNDANCY PROVIDED BY JETS ON REMAINING THREE MANIFOLDS. LOSS OF ALL REDUNDANCY MAY PREVENT ON-ORBIT OPERATIONS THUS MISSION OBJECTIVES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12306 ABORT: 3/2R

ITEM: MANIFOLD 3, JETS HEATER CONTROL SWITCH 11

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 3, JETS
- 5) MANIFOLD 3, JETS HEATER CONTROL SWITCH 11

6)

7) 8)

9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL A14 S11 PART NUMBER: 36V73A14S11

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

PROPELLANTS IN JETS ON MANIFOLD 3 MAY FREEZE CAUSING LOSS OF JETS. REDUNDANCY PROVIDED BY JETS ON REMAINING THREE MANIFOLDS. LOSS OF ALL REDUNDANCY MAY PREVENT ON-ORBIT OPERATIONS THUS MISSION OBJECTIVES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3
MDAC ID: 12307 ABORT: 3/3

ITEM: MANIFOLD 3, JETS HEATER CONTROL SWITCH 11

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 3, JETS
- 5) MANIFOLD 3, JETS HEATER CONTROL SWITCH 11

6) 7)

7) 2)

8) 9)

### CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/3	RTLS:	3/3
3/3	TAL:	3/3
•	AOA:	3/3
	ATO:	3/3
3/3		,
	3/3 3/3 3/3 3/3	3/3 RTLS: 3/3 TAL: 3/3 AOA: 3/3 ATO:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S11 PART NUMBER: 36V73A14S11

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

NO EFFECT. REQUIRES ADDITIONAL FAILURE (THERMOSTAT) TO CAUSE OVERHEATING OF PROPELLANTS.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/2R SUBSYSTEM: ARCS ABORT: 3/2R MDAC ID: 12308

MANIFOLD 3, JETS HEATER CONTROL SWITCH 11 ITEM:

FAILURE MODE: SWITCH FAILS SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 3, JETS 5) MANIFOLD 3, JETS HEATER CONTROL SWITCH 11

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7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL A14 S11 PART NUMBER: 36V73A14S11

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

PROPELLANTS IN JETS ON MANIFOLD 3 MAY FREEZE CAUSING LOSS OF JETS. REDUNDANCY PROVIDED BY JETS ON REMAINING THREE MANIFOLDS. LOSS OF ALL REDUNDANCY MAY PREVENT ON-ORBIT OPERATIONS THUS MISSION OBJECTIVES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12309 ABORT: 3/3

ITEM: MANIFOLD 3, JETS HEATER CONTROL SWITCH 11

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 3, JETS
- 5) MANIFOLD 3, JETS HEATER CONTROL SWITCH 11

6)

7)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	: 3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S11 PART NUMBER: 36V73A14S11

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

FLIGHT: 3/2R SUBSYSTEM: ARCS 3/2R ABORT: MDAC ID: 12310

MANIFOLD 3, JETS HEATER CONTROL SWITCH 11 ITEM:

FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE (WORST CAES)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 3, JETS 5) MANIFOLD 3, JETS HEATER CONTROL SWITCH 11

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL A14 S11 PART NUMBER: 36V73A14S11

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

SHORT TO CASE WILL BLOW 1 AMP FUSE. PROPELLANTS IN JETS ON MANIFOLD 3 MAY FREEZE CAUSING LOSS OF JETS. REDUNDANCY PROVIDED BY JETS ON REMAINING THREE MANIFOLDS. LOSS OF ALL REDUNDANCY MAY PREVENT ON-ORBIT OPERATIONS THUS MISSION OBJECTIVES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12311 ABORT: 3/2R

ITEM: MANIFOLD 4, JETS HEATER CONTROL SWITCH 12

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 4, JETS
- 5) MANIFOLD 4, JETS HEATER CONTROL SWITCH 12

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL A14 S12 PART NUMBER: 36V73A14S12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

PROPELLANTS IN JETS ON MANIFOLD 4 MAY FREEZE CAUSING LOSS OF JETS. REDUNDANCY PROVIDED BY JETS ON REAMINING THREE MANIFOLDS. LOSS OF ALL REDUNDANCY MAY PREVENT ON-ORBIT OPERATIONS THUS MISSION OBJECTIVES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12312 ABORT: 3/3

ITEM: MANIFOLD 4, JETS HEATER CONTROL SWITCH 12

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL SUBSYSTEM
- 4) MANIFOLD 4, JETS
- 5) MANIFOLD 4, JETS HEATER CONTROL SWITCH 12

6) 7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S12 PART NUMBER: 36V73A14S12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT. REQUIRES ADDITIONAL FAILURE (THERMOSTAT) TO CAUSE OVERHEATING OF PROPELLANTS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12313 ABORT: 3/2R

ITEM: MANIFOLD 4, JETS HEATER CONTROL SWICH 12

FAILURE MODE: SWITCH FAILS SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 4, JETS
- 5) MANIFOLD 4, JETS HEATER CONTROL SWITCH 12

6)

7)

8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING	: 3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL A14 S12 PART NUMBER: 36V73A14S12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

PROPELLANTS IN MANIFOLD 4 MAY FREEZE CAUSING LOSS OF JETS.
REDUNDANCY PROVIDED BY JETS ON REMAINING THREE MANIFOLDS. LOSS
OF ALL REDUNDANCY MAY PREVENT ON-ORBIT OPERAITONS THUS MISSION
OBJECTIVES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12314 ABORT: 3/3

ITEM: MANIFOLD 4, JETS HEATER CONTROL SWITCH 12

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 4, JETS
- 5) MANIFOLD 4, JETS HEATER CONTROL SWITCH 12
- 6)
- 7) 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S12 PART NUMBER: 36V73A14S12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12315 ABORT: 3/2R

ITEM: MANIFOLD 4, JETS HEATER CONTROL SWITCH 12

FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 4, JETS
- 5) MANIFOLD 4, JETS HEATER CONTROL SWITCH 12
- 6) 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		·

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: PNL A14 S12 PART NUMBER: 36V73A14S12

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

SHORT TO CASE WILL BLOW 1 AMP FUSE. PROPELLANTS IN MANIFOLD 4 MAY FREEZE CAUSING LOSS OF JET. REDUNDANCY PROVIDED BY JETS ON REMAINING THREE MANIFOLDS. LOSS OF ALL REDUNDANCY MAY PREVENT ON-ORBIT OPERATIONS THUS MISSION OBJECTIVES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 2/2 MDAC ID: 12316 ABORT: 2/2

ITEM: MANIFOLD 5, JETS HEATER CONTROL SWITCH 13

FAILURE MODE: SWITCH FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 5, JETS
- 5) MANIFOLD 5, JETS HEATER CONTROL SWITCH 13
- 6) 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S13 PART NUMBER: 36V73A14S13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

PROPELLANTS IN JETS ON MANIFOLD 5 MAY FREEZE CAUSING LOSS OF JETS. NO REDUNDANCY PROVIDED BY AFT VERNIERS. THIS MAY CAUSE LOSS OF MISSION OBJECTIVES.

HIGHEST CRITICALITY HDW/FUNC

DATE: 10/01/87 SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12317 ABORT: 3/3

ITEM: MANIFOLD 5, JETS HEATER CONTROL SWITCH 13

FAILURE MODE: SWITCH FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 5, JETS
- 5) MANIFOLD 5, JETS HEATER CONTROL SWITCH 13

6) 7)

8)

9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S13 PART NUMBER: 36V73A14S13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

NO EFFECT. REQUIRES ADDITIONAL FAILURE (THERMOSTAT) TO CAUSE OVERHEATING OF PROPELLANTS.

REFERENCES: VS70-943099 REV B EO B12, CP; JSC 11174, SPACE

SHUTTLE SYSTEMS HANDBOOK, PG 11.10, RCS SIG 2

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: 2/2

SUBSYSTEM: ARCS FLIGHT: 2/2
MDAC ID: 12318

FLIGHT: 2/2
ABORT: 2/2

ITEM: MANIFOLD 5, JETS HEATER CONTROL SWITCH 13

FAILURE MODE: SWITCH FAILS SHORT ACROSS CONTACT SET (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 5, JETS
- 5) MANIFOLD 5, JETS HEATER CONTROL SWITCH 13

6)

7) 8) 9)

CRITICALITIES

FLIGHT PHASE PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	HDW/FUNC 3/3 3/3 2/2 3/3 3/3	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 3/3 3/3 3/3 2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S13 PART NUMBER: 36V73A14S13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:
PROPELLANTS IN MANIFOLD 5 MAY FREEZE CAUSING LOSS OF JETS. NO
REDUNDANCY PROVIDED FOR AFT VERNIERS. THIS MAY CAUSE LOSS OF
MISSION OBJECTIVES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS

MDAC ID: 12319 FLIGHT: 3/3
ABORT: 3/3

ITEM: MANIFOLD 5, JETS HEATER CONTROL SWITCH 13

FAILURE MODE: SWITCH INADVERTENTLY OPENS/CLOSES (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 5, JETS
- 5) MANIFOLD 5, JETS HEATER CONTROL SWITCH 13
- 6)
- 7)
- 8) 9)

## CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
•	RTLS:	3/3
	TAL:	3/3
•	AOA:	3/3
	ATO:	3/3
3/3		-/-
	3/3 3/3 3/3 3/3	3/3 RTLS: 3/3 TAL: 3/3 AOA: 3/3 ATO:

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S13 PART NUMBER: 36V73A14S13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 2/2 MDAC ID: 12320 ABORT: 2/2

ITEM: MANIFOLD 5, JETS HEATER CONTROL SWITCH 13

FAILURE MODE: SWITCH SHORTS TO CASE OR POLE TO POLE (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THERMAL CONTROL SUBSYSTEM
- 4) MANIFOLD 5, JETS
- 5) MANIFOLD 5, JETS HEATER CONTROL SWITCH 13

6)

7) 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: PNL A14 S13 PART NUMBER: 36V73A14S13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

SHORT TO CASE WILL BLOW 1 AMP FUSE. PROPELIANS IN JETS ON MANIFOLD 5 MAY FREEZE CAUSING LOSS OF JETS. NO REDUNDANCY PROVIDED FOR AFT VERNIERS. THIS MAY CAUSE LOSS OF MISSION OBJECTIVES.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12321 ABORT: 1/1

ITEM: SIGNAL CONDITIONER OL1

FAILURE MODE: INCORRECT OR LOSS OF OUTPUT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) THRUSTER, AFT
- 5) SIGNAL CONDITIONER OL1

6)

7)

8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		,

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: LEFT OMS POD

PART NUMBER: 51V75A25

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

CHAMBER PRESSURE SENSOR DATA IS ROUTED THROUGH SIGNAL CONDITIONER. DATA RECEIVED AT GPC CAN DESELECT JET. THEREFORE, INCORRECT DATA MAY DESELECT +Y OR -Z JET. REDUNDANCY PROVIDED BY JETS ON DIFFERENT MANIFOLDS. LOSS OF ALL REDUNDANCY MAY CAUSE LOSS OF JETS REQURIED FOR RE-ENTRY. DESELECTION OF JET DURING RTLS/TAL MAY CAUSE INABILITY TO COMPLETE OMS/RCS ABORT DUMP.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12322 ABORT: 1/1

ITEM: SIGNAL CONDITIONER OL2

FAILURE MODE: INCORRECT OR LOSS OF OUTPUT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) THRUSTER, AFT
- 5) SIGNAL CONDITIONER OL2

6)

7)

8) 9)

CRITICALITIES

	<del></del>		
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
	•		•
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: LEFT OMS POD PART NUMBER: 51V75A77

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

CHAMBER PRESSURE SENSOR DATA IS ROUTED THROUGH SIGNAL CONDITIONER. DATA RECEIVED AT GPC CAN DESELECT JET. THEREFORE, INCORRECT DATA MAY DESELECT +Y OR -Z JET. REDUNDANCY PROVIDED BY JETS ON DIFFERENT MANIFOLDS. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR RE-ENTRY. DESELECTION OF JET DURING RTLS/TAL MAY CAUSE INABILITY TO COMPLETE AN OMS/RCS ABORT DUMP.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS

FLIGHT: 3/1R MDAC ID: 12323 ABORT: 1/1

ITEM: SIGNAL CONDITIONER OR1

FAILURE MODE: INCORRECT OR LOSS OF OUTPUT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) THRUSTER, AFT
- 5) SIGNAL CONDITIONER OR1

6)

7) 8)

9)

### CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC
3/3	RTLS:	1/1
3/1R	TAL:	1/1
3/2R	AOA:	3/1R
3/1R	ATO:	3/2R
3/3		J, 221
	3/3 3/1R 3/2R 3/1R	3/3 RTLS: 3/1R TAL: 3/2R AOA: 3/1R ATO:

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: RIGHT OMS POD

PART NUMBER: 52V75A24

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

CHAMBER PRESSURE SENSOR DATA IS ROUTED THROUGH SIGNAL CONDITIONER. DATA RECEIVED AT GPC CAN DESELECT JET. THEREFORE. INCORRECT DATA MAY DESELECT +Y OR -Z JET. REDUNDANCY PROVIDED BY JETS ON DIFFERENT MANIFOLDS. LOSS OF ALL REDUNDANCY MAY CAUSE LOSS OF JETS REQUIRED FOR RE-ENTRY. DESELECTION OF JET DURING RTLS/TAL MAY CAUSE INABILITY TO COMPLETE OMS/RCS ABORT DUMPS.

10/01/87 DATE:

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS

FLIGHT: 3/1R ABORT:

1/1

MDAC ID: 12324

SIGNAL CONDITIONER OR2

ITEM: FAILURE MODE: INCORRECT OR LOSS OF OUTPUT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) THRUSTER, AFT
- 5) SIGNAL CONDITIONER OR2

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	1/1
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	*		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: RIGHT OMS POD

PART NUMBER: 52V75A78

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

CHAMBER PRESSURE SENSOR DATA IS ROUTED THROUGH SIGNAL CONDITIONER. DATA RECEIVED AT GPC CAN DESELECT JET. THEREFORE, INCORRECT DATA MAY DESELECT +Y OR -Z JET. REDUNDANCY PROVIDED BY JET ON DIFFERENT MANIFOLD. LOSS OF ALL REDUNDANCY MAY CAUSE LOSS OF JETS REQUIRED FOR RE-ENTRY. DESELECTION OF JET DURING RTLS/TAL MAY CAUSE INABILITY TO COMPLETE OMS/RCS ABORT DUMP.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: /
MDAC ID: 12325 ABORT: /

ITEM: JET DRIVER (PRIMARY-ALL)
FAILURE MODE: JET DRIVER FAILS OFF

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) THRUSTER, AFT
- 5) JET DRIVER (PRIMARY-ALL)

6)

7) 8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC PRELAUNCH: / RTLS: / LIFTOFF: / TAL: / ONORBIT: / AOA: / DEORBIT: / ATO: / LANDING/SAFING: /

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: WITHIN RJDA #1 OR RJDA #2
PART NUMBER: 54V79A10 AND 56V79A11

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSS OF JET ASSOCIATED WITH +Y, -Y, OR -Z THRUST COMPONENT IS THE WORST CASE. REDUNDANCY FOR JET PROVIDED BY JET ON DIFFERENT MANIFOLD. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND TO EXPEL PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS. LOSS OF THRUSTER DURING RTLS/TAL ABORT CAUSES INABILITY TO COMPLETE A OMS DUMP.

REFERENCES: VS70-942099 REV D EO DO1

REPORT DATE: 2/26/88 E-588

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE: FLIGHT: SUBSYSTEM: ARCS ABORT: MDAC ID: 12326 JET DRIVER (PRIMARY-ALL) ITEM: FAILURE MODE: JET DRIVER FAILS ON LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST BREAKDOWN HIERARCHY: 1) ELECTRICAL COMPONENTS 2) CONTROLS 3) THRUSTER SUBSYSTEM 4) THRUSTER, AFT 5) JET DRIVER (PRIMARY-ALL) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT HDW/FUNC FLIGHT PHASE RTLS: TAL: AOA: / PRELAUNCH: LIFTOFF: ONORBIT: ATO: DEORBIT: LANDING/SAFING: REDUNDANCY SCREENS: A [ ] B [ ] C [ ] LOCATION: WITHIN RJDA #1 OR RJDA #2 PART NUMBER: 54V79A10 AND 56V79A11 CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD EFFECTS/RATIONALE: JET DRIVER FAILED ON WILL PROVIDE LATCHING ENERGY TO BI-

REFERENCES: VS70-942099 REV D EO D01

MISSION PHASE MAY CAUSE LOSS OF CREW/VEHICLE.

REPORT DATE: 2/26/88

E-589

PROPELLANT VALVES ALLOWING FIRING. CREW MUST ISOLATE PROPELLANT BY CLOSING ASSOCIATED MANIFOLD. INADVERTENT FIRING DURING ANY

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS FLIGHT: MDAC ID: 12327 ABORT: ITEM: JET DRIVER (VERNIER-ALL) FAILURE MODE: JET DRIVER FAILS OFF LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST BREAKDOWN HIERARCHY: 1) ELECTRICAL COMPONENTS 2) CONTROLS 3) THRUSTER SUBSYSTEM 4) THRUSTER, AFT 5) JET DRIVER (VERNIER-ALL) 6) 7) 8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC PRELAUNCH: / RTLS: / LIFTOFF: / TAL: / ONORBIT: / AOA: / DEORBIT: / ATO: / LANDING/SAFING: /

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: WITHIN RJDA #1 OR RJDA #2 PART NUMBER: 54V79A10 AND 56V79A11

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE JET ASSOCIATED WITH +Y AND -Y VERNIER THRUST COMPONENT. NO REDUNDANCY PROVIDED. THIS MAY CAUSE LOSS OF MISSION OBJECTIVES DUE TO LOSS OF VERNIERS.

REFERENCES: VS70-942099 REV D EO DO1

REPORT DATE: 2/26/88

E-590

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/2R ABORT: 3/2R SUBSYSTEM: ARCS MDAC ID: 12338

MICROSWITCH ITEM:

FAILURE MODE: ERRONEOUS OUTPUT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS4) L/R MANIFOLD 3, OX & FU ISOL VLVS.

5) MICROSWITCH

6)

7)

8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING	: 3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: 51V42LV238, 51V42LV237, 52V42LV338, 52V42LV337

PART NUMBER: J1-F (4 MICROSWITCHES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

FAILED MICROSWITCH PREVENTS ACCURATE VALVE POSITION DATA. REDUNDANCY PROVIDED BY OTHER VALVE. LOSS OF TALKBACK MAY LEAD TO FALSELY FAILING THE VALVE CLOSED THUS LIMITING ON-ORBIT OPERATIONS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: MDAC ID: 12328 ABORT:

ITEM: JET DRIVER (VERNIER-ALL)

FAILURE MODE: JET DRIVER FAILS ON

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) THRUSTER, AFT
- 5) JET DRIVER (VERNIER-ALL)
- 6) 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/	RTLS:	,
LIFTOFF:	/	TAL:	,
ONORBIT:		AOA:	7
DEORBIT:	/	ATO:	1
LANDING/SAFING	: /		,

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: WITHIN RJDA #1 OR RJDA #2 PART NUMBER: 54V79A10 AND 56V79A11

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

JET DRIVER FAILED ON WILL PROVIDE LATCHING ENERGY TO BI-PROPELLANT VALVES ALLOWING FIRING. CREW MUST ISOLATE PROPELLANT BY CLOSING MANIFOLD 5 ISOLATION VALVE. INADVERTENT FIRING DURING ANY MISSION PHASE MAY CAUSE LOSS OF CREW/VEHICLE.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 2/1R MDAC ID: 12329 ABORT: 2/1R

ITEM: DIODE

FAILURE MODE: FAILS OPEN (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) HE PRESS SUBSYSTEM
- 4) L/R HE OX & FU ISOL VLV B
- 5) DIODE
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	3/1R	
LIFTOFF:	3/1R	TAL:	3/1R	
ONORBIT:	3/2R	AOA:	2/1R	
DEORBIT:	2/1R	ATO:	2/1R	
LANDING/SAFING:	3/3		•	

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: 51V42LV201, 51V42LV202, 51V42LV203, 51V42LV204

PART NUMBER: J1-1 (8 DIODES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE DIODE REQUIRED TO OPEN THE VALVE. REDUNDANCY PROVIDED BY OTHER VALVE. LOSS OF THIS MAY CAUSE INABILITY TO EXPEL PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/3 MDAC ID: 12330 ABORT: 3/3

ITEM: DIODE

FAILURE MODE: FAILS SHORT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) HE PRESS SUBSYSTEM
- 4) L/R HE OX & FU ISOL VLV B
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/3	AOA:	3/3
DEORBIT:	3/3	ATO:	3/3
LANDING/SAFING	,		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 51V42LV201, 51V42LV202, 51V42LV203, 51V42LV204

PART NUMBER: J1-1 (8 DIODES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

NO EFFECT.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/2R ABORT: 3/2R SUBSYSTEM: ARCS ABORT: MDAC ID: 12331

ITEM: MICROSWITCH

FAILURE MODE: ERONEOUS OUTPUT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) HE PRESS SUBSYSTEM
- 4) L/R HE OX & FU ISOL VLV A OR B
- 5) MICROSWITCH
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
	•	ATO:	3/2R
DEORBIT:	3/3	AIO.	J/ 421
LANDING/SAFING:	: 3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: 51V42LV201, 51V42LV202, 51V42LV203, 51V42LV204

PART NUMBER: J1-6 (4 MICROSWITCHES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE: FAILED MICROSWITCH PREVENTS ACCURATE VALVE POSITION DATA. REDUNDANCY PROVIDED BY OTHER VALVE. LOSS OF TALKBACK MAY LEAD TO FALSELY FAILING THE VALVE CLOSED THUS LIMITING ON-ORBIT OPERATIONS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 2/2 MDAC ID: 12332 ABORT: 1/1

ITEM: MICROSWITCH

FAILURE MODE: ERRONEOUS OUTPUT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) L/R OX & FU TK ISOL 1/2
- 5) MICROSWITCH

6)

7)

8) 9)

CRITICALITIES

	O		
	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	1/1
LIFTOFF:	3/1R	TAL:	$\frac{1}{1}$
ONORBIT:	2/2	AOA:	2/1R
DEORBIT:	3/1R	ATO:	2/2
LANDING/SAFING:	3/3		-, -

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 51V42LV227, 51V42LV228, 51V42LV217, 51V42LV218 PART NUMBER: J1-F (FOUR MICROSWITCHES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

SWITCH FAILURE ACROSS THE CLOSE CONTACTS WILL NOT ALLOW THE VALVE TO BE CLOSED. THIS PREVENTS CROSSFEED OPRATION THUS LOSS OF MISSION OPERATIONS. INABILITY TO CROSSFEED MAY CAUSE INCOMPLETE OMS ABORT DUMP.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12333 ABORT: 3/1R

ITEM: MICROSWITCH

FAILURE MODE: ERRONEOUS OUTPUT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) L/R OX & FU ISOL TK 3/4/5 A & B
- 5) MICROSWITCH
- 6)
- 7)
- 8)
- 9)

## CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	3/3	
LIFTOFF:	3/3	TAL:	3/3	
ONORBIT:	3/2R	AOA:	3/1R	
DEORBIT:	3/1R	ATO:	3/2R	
LANDING/SAFING:	3/3		•	

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: 51V42LV265, 51V42LV266, 51V42LV263, 51V42LV264

PART NUMBER: J1-F (EIGHT MICROSWITCHES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

MICROSWITCH FAILED ACROSS THE OPEN CONTACTS PREVENTS VALVE FROM BEING OPENED. HARDWARE REDUNDANCY PROVIDED BY SECOND LEG OF 3/4/5 AND 1/2 VALVE. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR RE-ENTRY CONTROL.

10/01/87 HIGHEST CRITICALITY HDW/FUNC DATE:

FLIGHT: 3/1R ABORT: 3/1R SUBSYSTEM: ARCS MDAC ID: 12334

MICROSWITCH ITEM:

FAILURE MODE: ERRONEOUS OUTPUT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- CONTROLS
- PROP STOR & DIST SUBSYSTEMS 3)
- 4) L/R OX & FU CROSSFEED VLV 1/2
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	: 3/1R		•

REDUNDANCY SCREENS: A [ 2 ] B [NA ] C [ P ]

LOCATION: 51V42LV371, 51V42LV372, 51V42LV271, 51V42LV272 PART NUMBER: J1-F (4 MICROSWITCHES), J1-K (4 MICROSWITCHES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

MICROSWITCH FAILED ACROSS CLOSED CONTACTS PREVENTS VALVE FROM BEING CLOSED. THIS, COUPLED WITH THE LOSS OF ALL HARDWARE REDUNDANCY PREVENTS ISOLATION OF A THRUSTER LEAK.

REFERENCES: VS70-942099 REV D EO D01

REPORT DATE: 2/26/88 E-598

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R ABORT: 3/1R SUBSYSTEM: ARCS MDAC ID: 12335

ITEM: MICROSWITCH

FAILURE MODE: ERRONEOUS OUTPUT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
  3) PROP STOR & DIST SUBSYSTEMS
- 4) L/R OX & FU CROSSFEED VLV 3/4/5
- 5) MICROSWITCH

6)

7) 8)

9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/1R	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/1R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING	: 3/1R		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: 51V42LV373, 51V42LV374, 51V42LV273, 51V42LV274 PART NUMBER: J1-F (4 MICROSWITCHES), J1-K (4 MICROSWITCHES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

MICROSWITCH FAILED ACROSS CLOSED CONTACTS PREVENTS VALVE FROM BEING CLOSED TO ISOLATE A THRUSTER LEAK.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12336 ABORT: 3/2R

ITEM: MICROSWITCH

FAILURE MODE: ERRONEOUS OUTPUT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) L/R MANIFOLD 1, OX & FU ISOL VLVS.
- 5) MICROSWITCH
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		-,

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 52V42LV317, 52V42LV318
PART NUMBER: J1-F (4 MICROSWITCHES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

FAILED MICROSWITCH PREVENTS ACCURATE VALVE POSITION DATA.
REDUNDANCY PROVIDED BY OTHER VALVE. LOSS OF TALKBACK MAY LEAD TO
FALSELY FAILING THE VALVE CLOSED THUS LIMITING ON-ORBIT
OPERATIONS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12337 ABORT: 3/2R

ITEM: MICROSWITCH

FAILURE MODE: ERRONEOUS OUTPUT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) L/R MANIFOLD 2, OX & FU ISOL VLVS.
- 5) MICROSWITCH
- 6)
- 7) 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: 52V42LV327, 52V42LV328
PART NUMBER: J1-F (4 MICROSWITCHES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

FAILED MICROSWITCH PREVENTS ACCURATE VALVE POSITION DATA.
REDUNDANCY PROVIDED BY OTHER VALVE. LOSS OF TALKBACK MAY LEAD TO
FALSELY FAILING THE VALVE CLOSED THUS LIMITING ON-ORBIT
OPERATIONS.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/2R MDAC ID: 12339 ABORT: 3/2R

ITEM: MICROSWITCH

FAILURE MODE: ERRONEOUS OUTPUT (WORST CASE)

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) L/R MANIFOLD 4, OX & FU ISOL VLVS.
- 5) MICROSWITCH
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	3/2R	AOA:	3/3
DEORBIT:	3/3	ATO:	3/2R
LANDING/SAFING	: 3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ P ] C [ P ]

LOCATION: 51V42LV248, 51V42LV247, 52V42LV348, 52V42LV347

PART NUMBER: J1-F (4 MICROSWITCHES)

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

FAILED MICROSWITCH PREVENTS ACCURATE VALVE POSITION DATA.
REDUNDANCY PROVIDED BY OTHER VALVE. LOSS OF TALKBACK MAY LEAD TO
FALSELY FAILING THE VALVE CLOSED THUS LIMITING ON-ORBIT
OPERATIONS.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R SUBSYSTEM: ARCS ABORT: 3/1R MDAC ID: 12340

ITEM:

DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) HE PRESS SUBSYSTEM 4) L/R HE OX & FU ISOL VLV A
- 5) DIODE
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		

B[F] C[P] REDUNDANCY SCREENS: A [ 2 ]

LOCATION: AV BAY 4, PCA 1

PART NUMBER: 54V76A131A2CR5; A3CR4

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE ONE CIRCUIT TO OPEN ISOLATION VALVE. ELECTRICAL REDUNDANCY PROVIDED. HARDWARE REDUNDANCY PROVIDED BY OTHER VALVE. LOSS OF ALL REDUNDANCY CAUSES INABILITY TO EXPEL PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12341 ABORT: 3/1R

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) HE PRESS SUBSYSTEM
- 4) L/R HE OX & FU ISOL VLV A
- 5) DIODE
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AV BAY 4, PCA 1

PART NUMBER: 54V76A131A2CR6; A3CR5

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE ONE CIRCUIT TO OPEN ISOLATION VALVE. ELECTRICAL REDUNDANCY PROVIDED. HARDWARE REDUNDANCY PROVIDED BY OTHER VALVE. LOSS OF ALL REDUNDANCY CAUSES INABILITY TO EXPEL PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R ABORT: 3/1R SUBSYSTEM: ARCS ABORT: MDAC ID: 12342

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) HE PRESS SUBSYSTEM
- 4) L/R HE OX & FU ISOL VLV B
- 5) DIODE
- 6)
- 7)
- 8) 9)

### CRITICALITIES

	O1/2 2 2 O1 1 D D D D D D D D D D D D D D D D D		
FLIGHT PHASE  PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	HDW/FUNC 3/3 3/1R 3/2R 3/1R	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 3/1R 3/1R 3/1R 3/1R
LANDING/ SALING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AV BAY 6, PCA 3; AV BAY 5, PCA 2 PART NUMBER: 54V76A133A2CR16; 54V76A132A3CR22

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE ONE CIRCUIT TO OPEN ISOLATION VALVE. ELECTRICAL REDUNDANCY PROVIDED. HARDWARE REDUNDANCY PROVIDED BY OTHER VALVE. LOSS OF ALL REDUNDANCY CAUSES INABILITY TO EXPEL PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE: 2/26/88

E-605

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12343 ABORT: 3/1R

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) L/R HE OX & FU ISOL VLV B
- 5) DIODE
- 6)
- 7)
- 8) 9)

### CRITICALITIES

	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/1R
LIFTOFF:	3/1R	TAL:	3/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/1R
LANDING/SAFING:	3/3		- / <b>-</b>

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AV BAY 6, PCA 3; AV BAY 5, PCA 2 PART NUMBER: 56V76A133A2CR15; 55V76A132A3CR23

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE ONE CIRCUIT TO OPEN ISOLATION VALVE. ELECTRICAL REDUNDANCY PROVIDED. HARDWARE REDUNDANCY PROVIDED BY OTHER VALVE. LOSS OF ALL REDUNDANCY CAUSES INABILITY TO EXPEL PROPELLANTS TO MEET LANDING WEIGHT CONSTRAINTS.

REFERENCES: VS70-943099 REV B EO B12; JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE : 2/26/88 E-606

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 2/2 MDAC ID: 12344 ABORT: 2/2

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) PROP STOR & DIST SUBSYSTEMS
- 4) MANIFOLD 5, L/R OX & FU ISOL VLVS
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING:	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 6, PCA 3

PART NUMBER: 56V76A133AJ8-Z, J8-M

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE CAPABILITY TO OPEN ISOLATION VALVE. INABILITY TO OPEN ISOLATION VALVE PREVENTS VRCS OPERATION THUS LOSS OF MISSION.

REFERENCES: ECN 102-8023A

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12345 ABORT: 2/1R

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 1, RJDA
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AV BAY 4, PCA 1
PART NUMBER: 54V76A131A3CR1

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE ONE CIRCUIT FOR MANIFOLD 1 DIRVER POWER. ELECTRICAL REDUNDANCY PROVIDED. HARDWARE REDUNDANCY PROVIDED BY JETS ON OTHER MANIFOLDS. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY.

REFERENCES: VS70-943099 REV B EO B12, JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE : 2/26/88 E-608

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12346 ABORT: 2/1R

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 1, RJDA
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	•		•

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AV BAY 5, PCA 2 PART NUMBER: 55V76A131A3CR1

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE ONE CIRCUIT FOR MANIFOLD 1 DIRVER POWER. ELECTRICAL REDUNDANCY PROVIDED. HARDWARE REDUNDANCY PROVIDED BY JETS ON OTHER MANIFOLDS. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY.

REFERENCES: VS70-943099 REV B EO B12, JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12347 ABORT: 2/1R

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 1, RJDA
- 5) DIODE
- 6)
- 7)
- 8) 9)

### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	•		- /

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AV BAY 5, PCA 2 PART NUMBER: 55V76A132A2CR7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE ONE CIRCUIT FOR MANIFOLD 1 LOGIC POWER. ELECTRICAL REDUNDANCY PROVIDED. HARDWARE REDUNDANCY PROVIDED BY JETS ON OTHER MANIFOLDS. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY.

REFERENCES: VS70-943099 REV B EO B12, JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE : 2/26/88 E-610

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R ABORT: 2/1R SUBSYSTEM: ARCS MDAC ID: 12348

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
  4) MANIFOLD 1/L5, RJDA
- 5) DIODE
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	2/1R	
LIFTOFF:	3/1R	TAL:	2/1R	
ONORBIT:	3/2R	AOA:	3/1R	
DEORBIT:	3/1R	ATO:	3/2R	
LANDING/SAFING:	3/3			

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AV BAY 5, PCA 2 PART NUMBER: 55V76A132A2CR8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE ONE CIRCUIT FOR MANIFOLD 1 LOGIC POWER. ELECTRICAL REDUNDANCY PROVIDED. HARDWARE REDUNDANCY PROVIDED BY JETS ON OTHER MANIFOLDS. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12349 ABORT: 2/1R

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 2, RJDA
- 5) DIODE
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		-, -,

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AV BAY 5, PCA 2 PART NUMBER: 56V76A133A2CR2

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE ONE CIRCUIT FOR MANIFOLD 2 DRIVER POWER. ELECTRICAL REDUNDANCY PROVIDED. HARDWARE REDUNDANCY PROVIDED BY JETS ON OTHER MANIFOLDS. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY.

REFERENCES: VS70-943099 REV B EO B12, JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE: 2/26/88 E-612

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12350 ABORT: 2/1R

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

# BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 2, RJDA
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	•		

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AV BAY 4, PCA 1
PART NUMBER: 54V76A131A2CR1

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE ONE CIRCUIT FOR MANIFOLD 2 DRIVER POWER. ELECTRICAL REDUNDANCY PROVIDED. HARDWARE REDUNDANCY PROVIDED BY JETS ON OTHER MANIFOLDS. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: ARCS

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12351 ABORT: 2/1R

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 2, RJDA
- 5) DIODE
- 6)
- 7) 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:			J/ 210

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AV BAY 4, PCA 1 PART NUMBER: 54V76A131A3CR8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE ONE CIRCUIT FOR MANIFOLD 2 LOGIC POWER. ELECTRICAL REDUNDANCY PROVIDED. HARDWARE REDUNDANCY PROVIDED BY JETS ON OTHER MANIFOLDS. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY.

REFERENCES: VS70-943099 REV B EO B12, JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE: 2/26/88 E-614

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

FLIGHT: 3/1R SUBSYSTEM: ARCS ABORT: 2/1R MDAC ID: 12352

ITEM:

DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 2, RJDA 5) DIODE
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	2/1R	
LIFTOFF:	3/1R	TAL:	2/1R	
ONORBIT:	3/2R	AOA:	3/1R	
DEORBIT:	3/1R	ATO:	3/2R	
LANDING/SAFING	: 3/3			

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AV BAY 4, PCA 1 PART NUMBER: 54V76A131A3CR7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE ONE CIRCUIT FOR MANIFOLD 2 LOGIC POWER. ELECTRICAL REDUNDANCY PROVIDED. HARDWARE REDUNDANCY PROVIDED BY JETS ON OTHER MANIFOLDS. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12353 ABORT: 2/1R

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 3, RJDA
- 5) DIODE
- 6)
- 7)
- 8) 9)

# CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING	3/3		-,

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AV BAY 5, PCA 2
PART NUMBER: 55V76A132A2CR1

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE ONE CIRCUIT FOR MANIFOLD 3 DRIVER POWER. ELECTRICAL REDUNDANCY PROVIDED. HARDWARE REDUNDANCY PROVIDED BY JETS ON OTHER MANIFOLDS. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12354 ABORT: 2/1R

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 3, RJDA
- 5) DIODE
- 6)
- 7)
- 8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AV BAY 6, PCA 3
PART NUMBER: 56V76A133A3CR1

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE ONE CIRCUIT FOR MANIFOLD 3 DRIVER POWER. ELECTRICAL REDUNDANCY PROVIDED. HARDWARE REDUNDANCY PROVIDED BY JETS ON OTHER MANIFOLDS. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R MDAC ID: 12355 ABORT: 2/1R

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 3/R5, RJDA
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		-,

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AV BAY 6, PCA 3 PART NUMBER: 56V76A133A3CR8

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

## EFFECTS/RATIONALE:

LOSE ONE CIRCUIT FOR MANIFOLD 3 LOGIC POWER. ELECTRICAL REDUNDANCY PROVIDED. HARDWARE REDUNDANCY PROVIDED BY JETS ON OTHER MANIFOLDS. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY.

REFERENCES: VS70-943099 REV B EO B12, JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE : 2/26/88 E-618

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R SUBSYSTEM: ARCS ABORT: 2/1R MDAC ID: 12356

ITEM:

DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 3/R5, RJDA 5) DIODE

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	3/3	RTLS:	2/1R	
LIFTOFF:	3/1R	TAL:	2/1R	
ONORBIT:	3/2R	AOA:	3/1R	
DEORBIT:	3/1R	ATO:	3/2R	
LANDING/SAFING:	3/3			

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AV BAY 6, PCA 3
PART NUMBER: 56V76A133A3CR7

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE ONE CIRCUIT FOR MANIFOLD 3 LOGIC POWER. ELECTRICAL REDUNDANCY PROVIDED. HARDWARE REDUNDANCY PROVIDED BY JETS ON OTHER MANIFOLDS. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY.

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

SUBSYSTEM: ARCS FLIGHT: 3/1R ABORT: 2/1R MDAC ID: 12357

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 4, RJDA
- 5) DIODE

6)

7)

8) 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING	<b>:</b> 3/3		•

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AV BAY 4, PCA 1 PART NUMBER: 54V76A131A2CR2

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE ONE CIRCUIT FOR MANIFOLD 4 DRIER POWER. ELECTRICAL REDUNDANCY PROVIDED. HARDWARE REDUNDANCY PROVIDED BY JETS ON OTHER MANIFOLDS. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY.

REFERENCES: VS70-943099 REV B EO B12, JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE: 2/26/88 E-620

HIGHEST CRITICALITY HDW/FUNC DATE: 10/01/87

FLIGHT: 3/1R ABORT: 2/1R SUBSYSTEM: ARCS MDAC ID: 12358

DIODE ITEM:

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

## BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS

- 2) CONTROLS
  3) THRUSTER SUBSYSTEM
  4) MANIFOLD 4, RJDA
- 5) DIODE
- 6)
- 7) 8)
- 9)

### CRITICALITIES

FLIGHT PHASE H PRELAUNCH: LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING:	DW/FUNC 3/3 3/1R 3/2R 3/1R 3/3	ABORT RTLS: TAL: AOA: ATO:	HDW/FUNC 2/1R 2/1R 3/1R 3/2R
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REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AV BAY 6, PCA 3 PART NUMBER: 56V76A133A2CR1

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL SHOCK, OVERLOAD

# EFFECTS/RATIONALE:

LOSE ONE CIRCUIT FOR MANIFOLD 4 DRIVER POWER. ELECTRICAL REDUNDANCY PROVIDED. HARDWARE REDUNDANCY PROVIDED BY JETS ON OTHER MANIFOLDS. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 3/1R ABORT: 2/1R MDAC ID: 12359

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD 4, RJDA
- 5) DIODE
- 6)
- 7)
- 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING:	3/3		

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AV BAY 3, PCA 3 PART NUMBER: 56V76A133A3CR13

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

### EFFECTS/RATIONALE:

LOSE ONE CIRCUIT FOR MANIFOLD 4 LOGIC POWER. ELECTRICAL REDUNDANCY PROVIDED. HARDWARE REDUNDANCY PROVIDED BY JETS ON OTHER MANIFOLDS. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY.

REFERENCES: VS70-943099 REV B EO B12, JSC 11174, SPACE SHUTTLE SYSTEMS HANDBOOK

REPORT DATE: 2/26/88 E-622

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 3/1R ABORT: 2/1R SUBSYSTEM: ARCS MDAC ID: 12360

ITEM:

DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM 4) MANIFOLD 4, RJDA
- 5) DIODE
- 6)
- 7) 8)
- 9)

#### CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	2/1R
LIFTOFF:	3/1R	TAL:	2/1R
ONORBIT:	3/2R	AOA:	3/1R
DEORBIT:	3/1R	ATO:	3/2R
LANDING/SAFING	•		-

REDUNDANCY SCREENS: A [ 2 ] B [ F ] C [ P ]

LOCATION: AV BAY 3, PCA 3
PART NUMBER: 56V76A133A3CR5

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

#### EFFECTS/RATIONALE:

LOSE ONE CIRCUIT FOR MANIFOLD 4 LOGIC POWER. ELECTRICAL REDUNDANCY PROVIDED. HARDWARE REDUNDANCY PROVIDED BY JETS ON OTHER MANIFOLDS. LOSS OF ALL REDUNDANCY CAUSES LOSS OF JETS REQUIRED FOR ET SEPARATION AND RE-ENTRY.

DATE: 10/01/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: ARCS FLIGHT: 2/2 MDAC ID: 12361 ABORT: 2/2

ITEM: DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD L5, RJDA
- 5) DIODE
- 6)
- 7)
- 8)

9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING:	3/3		•

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 4, PCA 1 PART NUMBER: 54V76A131A3CR2

CAUSES: CONTAMINATION, VIBRATION, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE DRIVER POWER TO LEFT MANIFOLD 5 JETS. THIS LOSS OF

JETS ON MANIFOLD 5 THUS LOSS OF MISSION.

HIGHEST CRITICALITY HDW/FUNC 10/01/87 DATE:

FLIGHT: 2/2 ABORT: 2/2 SUBSYSTEM: ARCS MDAC ID: 12362

ITEM:

DIODE

FAILURE MODE: FAILS SHORT TO GROUND

LEAD ANALYST: D. HARTMAN SUBSYS LEAD: C.D. PRUST

#### BREAKDOWN HIERARCHY:

- 1) ELECTRICAL COMPONENTS
- 2) CONTROLS
- 3) THRUSTER SUBSYSTEM
- 4) MANIFOLD R5, RJDA
- 5) DIODE

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	3/3
LIFTOFF:	3/3	TAL:	3/3
ONORBIT:	2/2	AOA:	3/3
DEORBIT:	3/3	ATO:	2/2
LANDING/SAFING:	: 3/3		

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: AV BAY 5, PCA 2

PART NUMBER: 54V76A131A3CR3

CAUSES: CONTAMINATION, VIBRATIN, MECHANICAL SHOCK, THERMAL

SHOCK, OVERLOAD

EFFECTS/RATIONALE:

LOSE DRIVER POWER TO RIGHT MANIFOLD 5 JETS. THIS CAUSES LOSS OF JETS ON MANIFOLD 5 THUS LOSS OF MISSION.

#### APPENDIX F

# NASA FMEA TO IOA WORKSHEET CROSS REFERENCE / RECOMMENDATIONS

This section provides a cross reference between the NASA FMEA and the corresponding IOA assessment worksheets included in Appendix C. The Appendix F identifies: NASA FMEA Number, IOA Assessment Number, NASA criticality and redundancy screen data, IOA recommended criticalities and redundancy screens, and issue codes.

# HARDWARE ISSUE CODES

- HDW 1 IOA recommends that this failure mode be upgraded to a CIL item.
- HDW 2 IOA recommends a criticality and/or screen upgrade.
- HDW 3 IOA recommends a criticality and/or screen downgrade.
- HDW 4 IOA recommends that this failure mode be added to the FMEA/CIL.
- HDW 5 IOA recommends that this item be added to the FMEA/CIL.
- HDW 6 IOA recommends editorial revisions to this FMEA/CIL.
- HDW 7 IOA recommends a 1/1 abort criticality for this failure mode.
- HDW 8 NASA/RI added this new FMEA and CIL per IOA issue.

# EPD&C ISSUE CODES

- EPD&C 1 IOA recommends a 3/2R PPP for this failure mode (loss of talkback data leading to falsely failing a valve closed).
- EPD&C 2 IOA recommends a downgrade for this FMEA/CIL based on IOA interpretation of NSTS 22206.
- EPD&C 3 IOA recommends an upgrade or an addition of other failure scenarios that have 1R or CIL criticalities.
- EPD&C 4 This EPD&C issue is tied to a IOA hardware issue.
- EPD&C 5 IOA recommends this item and failure be added to the FMEA/CIL.
- EPD&C 6 IOA recommends a criticality/screen upgrade to the FMEA/CIL.

APPENDIX F

NASA FMEA TO IOA WORKSHEET CROSS REFERENCE / RECOMMENDATIONS - FORWARD HARDWARE

IDEN	TIFIERS		NASA	!!		1	OA	RECO	MMENDATIONS	
NASA   FMEA NUMBER	IOA ASSESSMENT NUMBER	CRIT	SCREENS   A B C	-  .    	CRIT HW/F	S	CRE B	ENS C	OTHER (SEE LEGEND CODE)	ISSUE
03-2F-101010-1	FRCS-100	======    1/1	*********	=     =		==	<b>2</b> 22	2422:		====:
03-2F-101013-1	FRCS-105	1/1	1							1
1	FRCS-107	1/1	1	!!		!				
03-2F-101020-3	FRCS-103	3/1R	   P P P		7/10		_	_		1
03-2F-101020-4	FRCS-104	3/1R	PPP		3/1R 2/1R	Į P	, r	P	HDW 1	X
03-2F-101030-1	FRCS-10004X	3/1R	PFP	11	2/ IK		Р	Р	HDW 1	į x
1	FRCS-111	3/1R	PFP	11		1				!
03-2F-101030-2	FRCS-112	3/1R	I P P P	11	2/1R	!   P	_	_	1 404	!
03-2F-101050-1	FRCS-144	3/3	1	11	27 IK	-	F	Р	HDW 1	l x
	FRCS-145	3/3	i	H		i I				!
03-2F-101060-1	FRCS-10001X	1/1	ĺ	Н		¦			1	
1	1	1/1	į	ii	1/1	i i			1 450 5	
03-2F-101060-2	1 ****	2/1R	PNAP	H	., .	! 			HDW 5	X
03-2F-101060-3	FRCS-141	3/1R	FNAP	ii		! !			1	
03-2F-101060-4	FRCS-141A	3/1R	PNAP	ii		 			! !	
03-2F-101060-5	FRCS-140A	2/1R	P F P	ii -					! !	
03-2F-101070-1	FRCS-101	2/1R	FFP	ii	1				! !	
03-2F-101070-2	FRCS-102	3/3	İ	ii	j				[ ]	
03-2F-101080-1	FRCS-159	2/1R	F F P	П	2/1R	F	F	P	I HDW 4	
!	FRCS-163	2/1R	FFP	ii	2/1R	F	F	P	HDW 4	Х
	FRCS-167	2/1R	FFP	ii	2/1R	F	F	P	HDW 4	Х
	FRCS-171	2/1R	FFP	ii	2/1R	F	F	Р	HDW 4	X
	FRCS-175	2/1R	FFP	ii	2/1R	F	F	P	HDW 4	X
03-2F-101080-2	FRCS-160	3/3		::	3/3	•	•	. !	HDW 4	X
	FRCS-164	3/3	,	: :	3/3			1	HDW 4	X
[	FRCS-168	3/3		: :	3/3			1	HDW 4	X
!	FRCS-172	3/3		i	3/3			j	HDW 4	X
 	FRCS-176	3/3			3/3			;	HDW 4	X
03-2F-101090-1	FRCS-130	3/1R	FFP	:	3/1R	F	F	P	HDW 4	X
03-2F-101090-2	FRCS-131	3/3	j	:	3/3		•	`	HDW 4	X
03-2F-101091-1	FRCS-109	3/1R	FFP	:	3/1R	F	F	p I	HDW 4	X
	FRCS-117	3/1R	FFP	:	3/1R	F	F	P	HDW 4	X
	FRCS-121	3/1R	FFP	i :	3/1R	F	F	P	HDW 4	X
 	FRCS-142	3/1R	FFP		3/1R	_		ΡÍ	HDW 4	X X
03-2F-101091-2	FRCS-110	3/3	i	•	3/3			i	HDW 4	
	FRCS-118	3/3	i		3/3 j			i	HDW 4	X X
	FRCS-122	3/3	į	1	5/3			i	HDW 4	
07 07 40400	FRCS-143	3/3	i	:	5/3			i	HDW 4	X
03-2F-101095-1	FRCS-119	3/3	i	:		P	F	ΡÏ	HDW 1	X
03-2F-101095-2	FRCS-120	3/1R	PFP			_		. , P	HDW 2	X
03-2F-101095-3	FRCS-10005X	2/1R	PPP	:	/1			i	HDW 2, 8	X X
03-2F-102106-1	FRCS-138	1/1	i	ĺ	i			i		^
03-2F-102108-1	FRCS-124	1/1	i	ĺ	i			i	 	
03-2F-102110-1	FRCS-158	3/1R	PPP	2	/1R	PI	P	• i	HDW 1	· ·
		/ '''   ========	:=======:	, <sup>c</sup>	' '	r   ==2:	r (	-   	una j	<b>X</b> ;

IDENTI	IERS	N/	ASA				   	10	A R	ECOM	MENDATIONS		
NASA   FMEA NUMBER	IOA Assessment number	CRIT   HW/F	SC	REE	NS C		CRIT	SC A	REE B	NS C	OTHER	- ' !	į
03-2F-102110-1	FRCS-162	3/1R	P	P	P	1	2/1R	   P	P	P	HDW 1	ίx	i
j	FRCS-166	3/1R	P	P	P	İ	2/1R	P	P	P	HDW 1	x	
i	FRCS-170	3/1R	P	P	P	İ	2/1R	P	P	P	HDW 1	X	
03-2F-102110-2	FRCS-157	3/1R	P	NA	P	ĺ	1					1	-
j	FRCS-161	3/1R	P	NA	P	Ì	1	1					
İ	FRCS-165	3/1R	P	NA	P	Ì	1	l			1		ı
İ	FRCS-169	3/1R	P	NA	P	1	1	İ					- 1
03-2F-102110-3	FRCS-10012X	3/3	1			1	1/1	Ì			HDW 1	X	- 1
03-2F-102112-1	FRCS-147	1/1	1			1	1/1				HDW 5	x	- 1
1	FRCS-177	1/1	1				1/1	1			HDW 5	x	ŀ
03-2F-102120-1	FRCS-148	3/1R	P	P	P	1	2/1R	P	P	F	HDW 1	x	
	FRCS-150	3/1R	P	P	P	1	2/1R	P	P	Р	HOW 1	x	١
1	FRCS-152	3/1R	P	P	P	1	2/1R	P	P	P	HDW 1	x	-
03-2F-102120-2	FRCS-149	3/1R	P	NA	Ρ	1							- 1
1	FRCS-151	3/1R	P	NA	Ρ							l	١
03-2F-102120-3	FRCS-10010X	3/3	1			1	2/1R	P	NA	Р	HDW 1	X	
03-2F-102150-1	FRCS-126	2/1R	F	F	P	1	1						-
1	FRCS-132	2/1R	F	F	P	1	1	l				l	ļ
1	FRCS-134	2/1R	F	F	P	1		l			1	l	-
1	FRCS-136	2/1R	F	F	P	1	1				1		ļ
1	FRCS-153	2/1R	F	F	P	١		l			1	l	١
1	FRCS-155	2/1R	F	F	P		1	l			!	ļ	
03-2F-102150-2	FRCS-127	3/3				١	3/3				HDW 4	X	- [
	FRCS-133	3/3				ļ	3/3				HDW 4	×	- [
1	FRCS-135	3/3	1			ļ	3/3				HDW 4	į x	-
	FRCS-137	3/3	ļ			ļ	3/3	!			HDW 4	į x	-
ļ	FRCS-154	3/3	]			ļ	3/3				HDW 4	X	ı
	FRCS-156	3/3	ļ			ļ	3/3	!			HOW 4	į x	
03-2F-102170-1	FRCS-174	2/2	ļ			ļ				_			ļ
03-2F-102170-2	FRCS-173	3/2R	P	Р	Р	ļ	3/1R	Р	NA	Р	HDW 2	X	- !
03-2f-102170-3	FRCS-177A	1/1	ļ			ļ	1/1	!			HDW 5	) X	ļ
03-2F-111110-1	FRCS-123	1/1	!			ļ	,	!			1		- !
03-2F-111110-3	FRCS-128	1 1/1				ļ		ļ			NDW 6	j X	- !
03-2F-121308-1	FRCS-179	1/1	!			١		ļ			HDW 6	X	į
03-2F-121310-1	FRCS-10116X	3/3	! -	_	_	ļ	1/1	ļ			HDW 1	X	
03-2F-121310-2	FRCS-181	3/1R	:		P	!	1/1	<u> </u>			HDW 2	X	ļ
	FRCS-185	3/1R	:	P		ļ	1/1	! •			HDW 2	X	1
ļ	FRCS-187	3/1R	:	P		ļ	1/1				HDW 2	X	!
1 07 05 404740 7	FRCS-189	3/1R	:	P	P	!	1/1		_		HDW 2	X	ļ
03-2F-121310-3	FRCS-10015X	3/1R	: -	P	P	1	3/2R		P	P	HDW 3	X	
	FRCS-184	3/1R	F	P	P	1	3/2R	l r	P	P	HDW 3	X   X	
1	FRCS-186   FRCS-188	3/1R	F	_	P	ŀ	2/1R	ļ <b>r</b> I	-	P	HDW 2	^	-
1 07-25-121712-4	:	3/1R	F	P	-	1	I	i t			1	 	
03-2F-121312-1	FRCS-197	1/1	1			l	1	<b>l</b> !			1	1	-
03-2F-121313-1		1/1	! !			1	1	l 1			1	1	1
03-2F-131310-1		2/2	1			1	1	1 1			1	1	1
   03-2F-131310-2	FRCS-196		1			I	   1/1	1 			HDW 2	l x	- 1
03-21-131310-2	•	2/2	1			ا 	1/1	I			NUW 2	•	١

IDENTI	FIERS	N/	NSA		10	A R	ECOM	MENDATIONS	
NASA   FMEA NUMBER	IOA     ASSESSMENT NUMBER	CRIT   HW/F	SCREENS A B C	CRIT	SC	REE 8	NS C	OTHER	ISSUE
03-2F-131310-2	FRCS-195	2/2		1/1	 			HDW 2	X
03-2F-131310-4	FRCS-198	1/1			1				ĺ
NONE	FRCS-10002X			2/1R	P	F	F	HDW 4	x
İ	FRCS-10003X	1		1/1	ĺ			HDW 5	x
1	FRCS-10006X			1/1	ĺ			HDW 5	х
1	FRCS-10008X			3/1R	F	NA	P	HDW 4	x
1	FRCS-10011X		[						i i
1	FRCS-10013X	!							l l
1	FRCS-10014X	1		2/1R	P	NA	P	HDW 4	x
1	FRCS-10016X								
1	FRCS-10017X								
1	FRCS-10018X			1/1				HDW 5	X
1	FRCS-10019X			1/1				HDW 5	x
1	FRCS-10042X			1/1				HDW 4	x
1	FRCS-103A			3/1R	P	F	P	HDW 4	x
1	FRCS-106								
1	FRCS-108								
1	FRCS-113			2/1R	P	F	P	HDW 4	x
	FRCS-114			1/1				HDW 5	x
	FRCS-115	1		3/2R	P	F	P	HDW 4	x
	FRCS-116				1			1	
	FRCS-125				1				
	FRCS-129				1				
1	FRCS-139				1				
1	FRCS-140			2/1R	P	F	P	HDW 4	X
1	FRCS-146			1/1				HDW 5	X
	FRCS-149A			3/1R	P	NA	P	HDW 4	X
	FRCS-151A			3/1R	P	NA	Ρ	HDW 4	X
	FRCS-178	1		2/2	l			HDW 4	x [
1	FRCS-180	1			l			1	
1	FRCS-182	1		1/1	1			HDW 5	x į
	FRCS-183	1		2/1R	F	P	P	HDW 4	X I
1	FRCS-190								
1	FRCS-191	1 1						ĺ	İ
1	FRCS-194	1		1/1	1			HDW 5	x j
		******	.========	· 	====	===:			

APPENDIX F

NASA FMEA TO IOA WORKSHEET CROSS REFERENCE / RECOMMENDATIONS - AFT HARDWARE

IDENT	IFIERS	NASA					IOA RECOMMENDATIONS							
NASA FMEA NUMBER	IOA   ASSESSMENT NUMBER	CRIT	!	REEI B		-   :     	CRIT     HW/F    ======	••	В	NS C	•	OTHER LEGEND CODE)	ISSUE	
	ARCS-199	1/1	I			i	į				İ			
03-2A-201013-1	ARCS-204	1/1	1			١					ļ			
	ARCS-206	1/1	ļ			-					<u> </u>		i	
03-2A-201020-1	ARCS-203	2/1R	P	P	P	ļ	]				!		   v	
03-2A-201020-2	ARCS-202	3/1R	P	P	P	ı	3/1R	Р	F	Р	HDW 1		) X	
03-2A-201030-1	ARCS-10022X	3/1R	P	F	P	- [					!		1	
	ARCS-210	3/1R	P	F	P	1					1		l 1 v	
03-2A-201030-2	ARCS-211	2/1R	P	P	F	- 1	2/1R	P	F	F	HDW 2		l X	
	ARCS-212	2/1R	P	Ρ	F	- 1	2/1R	P	F	F	HDW 2		! ^	
03-2A-201050-1	ARCS-245	3/3	1			l		ļ			!		1	
	ARCS-246	3/3	ļ			١	1	!			!		!	
03-2A-201060-1	ARCS-10027X	1/1	1			1	1/1	•			HDW 5		X	
03-2A-201060-2	ARCS-10025X	2/1R	P	NA	P	İ	1				!		!	
03-2A-201060-3	ARCS-242	3/1R	F	NA	P	-		1			!		1	
03-2A-201060-4	ARCS-242A	3/1R	P	N/	N P	١	1	1			!		1	
03-2A-201060-5	ARCS-241A	2/1R	P	F	Ρ	- 1		1			!			
03-2A-201070-1	ARCS-200	2/1R	F	F	P		2/1R	F	F	P	HDW 4		ļ X	
03-2A-201070-2	ARCS-201	3/3	1				3/3	İ			HDW 4		X	
03-2A-201080-1	ARCS-254	2/1R	F	F	Ρ	· 1	2/1R	F	F	P	HDW 4		X	
	ARCS-256	2/1R	F	F	P	1	2/1R	F	F	Р	HDW 4		į x	
	ARCS-268	2/1R	F	F	P	۱ ۱	2/1R	F	F	Ρ	HDW 4		X	
	ARCS-272	2/1R	F	F	P		2/1R	F	F	P	HDW 4	•	X	
	ARCS-276	2/1R	F	F	P	'	2/1R	F	F	P	HDW 4		Į X	
	ARCS-280	2/1R	F	F	P	•	2/1R	F	F	P	HDW 4		l X	
	ARCS-284	2/1R	F	F	P	•	2/1R	F	F	P	HDW 4	•	X	
03-2A-201080-3	ARCS-255	3/3	1				3/3	1			HDW 4	•	X	
03 LA 201000 -	ARCS-257	3/3	Ì				3/3	1			HDW 4	•	X	
	ARCS-269	3/3	İ				3/3	1			HDW 4	•	X	
	ARCS-273	3/3	İ				3/3	1			HDW 4	<b>4</b>	l x	
	ARCS-277	3/3	İ				3/3	1			HDW 4	4	X	
	ARCS-281	3/3	İ				3/3	1			HDW 4		i x	
	ARCS-285	3/3	1				3/3	ļ			HDW 4	4	l x	
03-2A-201090-1	ARCS-229	3/1R	:   F	: F	F	P	3/1R	F	F	P	HDW 4		l x	
<b>33 2.1. 20</b> 1010	ARCS-233	3/1F	:   F	F	•	P	3/1R	F	F	P	HDW 4	4	X	
	ARCS-235	3/1F	t   1	F		P	3/1R	F	F	P	HDW		X	
03-2A-201090-2	ARCS-230	3/3	1				3/3				HDW .		) X	
	ARCS-234	3/3	1				3/3	1			HDW		X	
	ARCS-236	3/3	1				3/3				HDW		X	
03-2A-201091-1	ARCS-208	3/1	₹	F F	: 1	P	3/1R	F	F	P	HDW		X	
	ARCS-216	3/19	R   I	FF	•	P	3/1R	F	F	P	HDW		X	
	ARCS-220	3/11	₹	F F	=	P	3/1R	F	F	P	HDW		l ×	
	ARCS-243	3/10	R   1	F F	-	P	3/1R	F	F	P	HDW		X	
03-2A-201091-2	ARCS-209	3/3					3/3	1			HOW		X	
	ARCS-217	1 3/3	1				1 3/3	1			HDW	4	X	

IDENT	FIERS	N	ASA				 	ı	OA	RECO	MMENDA	TIONS	
NASA   FMEA NUMBER	IOA   ASSESSMENT NUMBER	CRIT    HW/F	S	CRE B	ENS C	   	CRIT    HW/F	S	CRE	ENS C	   (s	OTHER EE LEGEND CODE	ISSUE
03-2A-201091-2	ARCS-221	======: 	###:	===	223:	==	======	: ==	===:	===:		************	== =====
1	ARCS-244	3/3    3/3	!			- 1	3/3	!			HDW		x
03-2A-201095-1	ARCS-218	3/3   3/3				ļ	3/3		_	_	HDW	-	X
03-24-201095-2	ARCS-219	3/3   2/1R	   P		F		2/1R	Į P	F	Р	HDW	1	l x
03-2A-201095-3	ARCS-10023X	1/1	-	r	r	1	!				1	_	
03-2A-202108-1	ARCS-223	1/1	ί Ι				1				HDW	8	!
j		1/1	! !			i	1	1			1		!
03-2A-202110-1	ARCS-251	3/1R	P	Þ	P		1 3/1R	!   Р	В	Р	4011	4 7	
1	ARCS-253	3/1R	l P	Р	P	1	37 ik	F 	•	•	i una	1, 7	X
03-2A-202110-2	ARCS-10029X	3/3		•	•	i	2/1R	   P	N.	P	I HDW	1	
1	1	3/3				i	3/1R	P		P	HOW	·	X
03-2A-202110-3	1 :	2/2				i	1	'	"		1	۲	X
1	ARCS-252	2/2				i	i				i		
03-2A-202111-1	ARCS-260	3/1R	P	P	Р	i	i i				i I		
1	ARCS-262	3/1R	P	Р	P	i	<u>.</u>	i			1		l 1
03-2A-202111-2	ARCS-261	2/2	Р	P	P	i	i	İ			1		!
1	ARCS-263	2/2	P	P	P	i	Ì				i		1
03-2A-202111-3	ARCS-10033X	3/3				i	: _	] Р	NA	Р	HDW	2	   x
03-2A-202112-1	ARCS-248	1/1				i	•	i			HDW	_	l x
	ARCS-259	1/1				İ		İ			HDW		i x
!	ARCS-286	1/1				İ	1/1	i			HDW		i x
03-2A-202120-1	ARCS-266	3/1R	P	NA	P	İ	İ				i		^
!	ARCS-270	3/1R	P	NA	P	1					i		i
!	ARCS-274	3/1R	P	NA	P						i		i
 	ARCS-278	3/1R	P	NA	P						İ		i
03-2A-202120-2	ARCS-10035X	3/3					2/1R	P	NA	P	HDW	1	i x
03-2A-202120-3	ARCS-267	3/1R	P	P	P	11	3/1R	P	P	P	HDW	1, 7	j x
	ARCS-271	3/1R	P	P	P		3/1R	P	P	P	HOW	1, 7	i x
	ARCS-275	3/1R	P	P	P		3/1R	P	P	P	HDW '	1, 7	j x
07 24 2024/0 4	ARCS-279	3/1R	Р	P	P		3/1R	P	P	P	HDW	1, 7	j x
03-2A-202140-1	ARCS-283	2/2				11							İ
03-2A-202140-2	ARCS-282	3/1R	P	NA	Ρ		ļ						İ
03-2A-202140-3	ARCS-10036X	•				Ш				- 1			ĺ
03-2A-202150-1	ARCS-286A					11	1/1			l	HDW 5	5	X
1 03.54.505130-1	ARCS-225    ARCS-231	2/1R	F	F	P	П	ļ			1			İ
! !	1.	2/1R	F	F	P	Ш	ļ						1
03-2A-202150-2	ARCS-237	2/1R	F	F	Р	!!							1
1	ARCS-226    ARCS-232	3/3				Ш	3/3			- 1	HDW 4	•	x
;	ARCS-232    ARCS-238	•				II	3/3			Ī	HDW 4		X
'	ARCS-222	3/3				Ш	3/3			ļ	HDW 4	•	x
03-2A-211110-2	ARCS-227	1/1				П	!			. !			1
03-2A-211120-1	ARCS-239	1/1					ļ			ļ	HDW 6	•	X
03-2A-221308-1	ARCS-288	1/1   1/1				11	ŀ			!			
03-2A-221310-1	ARCS-290	3/1R	E	D	ь		1,4			Į.			
	ARCS-294	3/1R			P D		1/1			ļ	HDW 2		x
	ARCS-296	3/1R			P P	H	1/1			!	HDW 2		x
i	ARCS-298	3/1R	_	_	P P	11	1/1			!	HDW 2		l x
; ************************************	 	========		, ===		 	1/1			 	HDW 2		) x

IDE	NTIFIERS		ASA			IOA RECOMMENDATIONS							
NASA FMEA NUMBER	IOA ASSESSMENT NUMBER	CRIT	SCREE	NS C	CRIT    HW/F	SC	REE B	NS C	OTHER (SEE LEGEND CODE)	ISSUE			
.=====================================		======    3/3	===== 		======    1/1	= = = 	222	32 3 #	HDW 1	=====   X			
03-2A-221310-4	ARCS-293	3/3   3/1R	   F P	Р	3/1R	l I F	P	P	HDW 2, 7	X			
03 ER E21310 4	ARCS-295	3/1R	F P	P	3/1R	l F	Р	P	HDW 2, 7	,   х			
	ARCS-297	3/1R	FP		3/1R	F	Р	P	HDW 2, 7	i x			
03-2A-221312-1	ARCS-306	1/1	¦ ' '	•	11	1	•	•	<b>_,</b> .	i			
03-2A-221313-1	ARCS-306A	1/1	! 		ii	1			i İ	! 			
03-2A-231310-1	ARCS-302	2/2	i		ii	i			i	i			
OS EX ESTATO	ARCS-305	2/2	i		11	•			i	i			
03-2A-231310-2	ARCS-307	1/1	i		11	i				, [			
03-2A-231310-3	ARCS-301	3/1R	   F P	P	1/1	i			HDW 2	ı x			
05 EX E51510 5	ARCS-304	3/1R	I F P		11 1/1	i			HDW 2	l x			
NONE	ARCS-10020X	)	i ' '	•	1/1    2/1R	l l P	F	F	HDW 4	i x			
nont	ARCS-10021X	11	<u> </u>			<u>'</u>	•	•	HDW 5	) ^   X			
	ARCS-10024X	;	! !		11 1/1	! 			HDW 5	l x			
	ARCS-10026X	1 <b>1</b> 1 <b>1</b>	i i		1/1    3/1R	!   F	MA	Р	HDW 4	ı ^ I X			
	ARCS-10028X		) [		3/1R	l P		P	HDW 4	l x			
	ARCS-10031X	: 1   1	i i		11	¦ '	•	•	1				
	ARCS-10031X	i ( I 1	1		11	i			1	 			
	ARCS-10034X	1   1	1		11	!				i i			
	ARCS-10037X		!		11	1			1	! 			
	ARCS-10037X		ľ		11	1			) 	i I			
	ARCS-10039X		ľ		11	i				i I			
	ARCS-10040X		:		1/1	1			HDW 5	l x			
	ARCS-10041X		1		1/1	1			HDW 5	X			
	ARCS-10041X		!		1/1/1	1			HDW 4	X			
	ARCS-10043A		!		11 1/1 11 3/1R	l I P	F	Р	HDW 4	l x			
	ARCS-202A		!		3/    	1	•	•	1	1 ^ 1			
	ARCS-207		!		11 11	1			1	} [			
	ARCS-207		:			1			I HDW 5	l L X			
	ARCS-214	} 	<u> </u>		3/2R	!   P	F	D	HDW 4	l X			
	ARCS-214	l ! l l	!		11 3/28	1	'	r	1	! ^ !			
	ARCS-215	i i I i	<u> </u>		11 11	1				i i			
	ARCS-228	1 1 1 1	¦		11	1			1	l I			
	ARCS-240	i	<u> </u>		11	1			•	! [			
	ARCS-241		1		    2/1R	   P	_	P	HDW 4	i I X			
	ARCS-247		!		1/1	1 '	•	•	HDW 5	l ^			
	ARCS-249		1		3/1R	   P	ь	P	HDW 4, 7	X			
	ARCS-258		;		2/2	<u> </u>	•	•	HDW 4, 7	l X			
	ARCS-264	 	:		11 -7 -	1			1	, ^ !			
	ARCS-287		ł		2/2	1			HDW 4, 7	l x			
	ARCS-289		1		11 -7 - 11	1			1128 37 1	' ^ 			
	ARCS-291		1		    1/1	1			HDW 5	i I X			
	ARCS-291	1	1		1/1    3/1R	!   F	Р	Р	HDW 4, 7	l ^			
	ARCS-292		1		11 7/18	; '	r	•	"" " " "	. ^ 			
	ARCS-299	1	1		11	1			1	1 			
	ARCS-300		1		    1/1	1			   HDW 5	ı İ x			
	WKC2-303	11	ı		11 17 1	i			1 110 11 2	. ^			

APPENDIX F

NASA FMEA TO IOA WORKSHEET CROSS REFERENCE / RECOMMENDATIONS - FORWARD EPD&C

IDENTI	FIERS	N	ASA				IOA RECOMMENDATIONS						
NASA FMÉA NUMBER	IOA   ASSESSMENT NUMBER	CRIT	SC		NS C		CRIT HW/F	SCREENS A B C	OTHER (SEE LEGEND CODE)	ISSUE			
		======	====	===	====	ij		========					
03-2F-103340-2	FRCS-1197	3/2R	P	Р	P	İİ			į	i			
	FRCS-1198	3/2R	P	Ρ	Р	11				İ			
	FRCS-1199	3/2R	P	P	Р	II	j		İ	İ			
	FRCS-1200	3/2R	P	Ρ	Ρ	11				i			
	FRCS-1201	3/2R	P	P	Р	11				İ			
	FRCS-1202	3/2R	P	P	P	П							
	FRCS-1203	3/2R	P	P	P	П				I			
	FRCS-1204	3/2R	P	Ρ	P	П	1		1	İ			
	FRCS-1205	3/2R	P	P	P	П				1			
	FRCS-1206	3/2R	P	P	P	$\  \ $			1	İ			
	FRCS-1207	3/2R	P	P	P	П				İ			
	FRCS-1208	3/2R	P	Ρ	P	П	ĺ			i			
03-2F-103345-1	FRCS-1290	3/2R	P	P	P		1		1	İ			
	FRCS-1291	3/2R	P	P	P	$\prod$				i			
	FRCS-1292	3/2R	P	P	P	11			ĺ	İ			
	FRCS-1296	3/2R	P	P	P	IÌ				İ			
	FRCS-1298	3/2R	P	P	P					İ			
03-2F-103345-2	FRCS-1293	3/2R	P	P	Ρ	Ħ			İ	i			
	FRCS-1295	3/2R	P	P	Ρ	İÌ	ĺ		İ	i			
	FRCS-1297	3/2R	P	P	Р	İİ			İ	i			
	FRCS-1299	3/2R	P	P	P	ii			İ	i			
	FRCS-1300	3/2R	P	P	Р	ii	2/2		EPD&C 6	i x			
03-2F-103350-1	FRCS-373	3/2R	P	P	P	İİ			İ	j			
	FRCS-374	3/2R	P	P	Р	İİ	İ		İ	i			
	FRCS-375	3/2R	P	P	P	ii	Ì		İ	i			
	FRCS-376	3/2R	P	P	P	ii	i		i	İ			
	FRCS-377	3/2R	P	P	P	ii	i			i			
	FRCS-378	3/2R	P	Р	P	İİ	i		į	i			
	FRCS-379	3/2R	P	P	Р	ii	i			i			
	FRCS-380	3/2R	P	Р	P	İİ	i		i	i			
03-2F-103350-2	FRCS-841	3/2R	P	P	Р	İÌ	i			i			
	FRCS-842	3/2R	į p	P	P	ii	i		İ	i			
	FRCS-843	3/2R	P	P	P	ii	i		İ	i			
	FRCS-844	3/2R	P	P	P	ii	i		, 	i			
	FRCS-845	3/2R	P	P	P	ii	i		İ	i			
	FRCS-846	3/2R	:	_	P	ij	j		İ	i			
	FRCS-847	3/2R	:	_	P	ii	i		•	i			
	FRCS-848	3/2R	•		P	ii	i		İ	i			
03-2F-103350-3	FRCS-863	3/2R	:		P	ii	i		i	ì			
	FRCS-864	3/2R			P	ii	i			i			
	FRCS-865	3/2R	P		P	ii	i		i	ì			
	FRCS-866	3/2R	P		P	ii				1			
	FRCS-867	3/2R	P	P	P	i				İ			
	FRCS-868	3/2R	:	P	P	::	!		!	1			

IDENTI	FIERS	ļ N/	ASA		IOA RECOMM	MENDATIONS	
NASA FMEA NUMBER	IOA     ASSESSMENT NUMBER	CRIT HW/F	SCREENS	CRIT	SCREENS	OTHER (SEE LEGEND CODE)	ISSUE
	=====================================	=======   3/2R		▎▎ਝ≡≡≡≡≡ ▎▎			
03-2F-103350-3	FRCS-870	3/2R		H	i		
	FRCS-871	3/2R		ii	i	İ	
	FRCS-872	3/2R	I P P P	ii	i	İ	
	FRCS-873	3/2R	l P P P	ii	i	1	1
	FRCS-874	3/2R	PPP	ii	i		1
	FRCS-875	3/2R	PPP	ii	į	İ	1
	FRCS-876	3/2R	PPP	ii	i	İ	
	FRCS-877	3/2R	PPP	ii	i	<u>.</u>	
	FRCS-878	3/2R	PPP	ii	i		1
03-2F-103360-1	FRCS-381	3/3	i	ii	j	1	
03-27-103300-1	FRCS-382	1 3/3	i	ii	İ		1
	FRCS-385	3/3	Ì	ii	İ		
	FRCS-386	3/3	i	ii	1	1	
03-2F-103370-1	FRCS-849	3/2R	P P P	ii		1	
03-21 103310 1	FRCS-850	3/2R	P P P	ii			1
	FRCS-851	]  3/2R	P P P	H	1		1
	FRCS-852	3/2R	PPP	İİ	1		ļ
	FRCS-853	3/2R	PPP	11	1		!
	FRCS-854	3/2R	PPP	11	1		ļ
	FRCS-855	3/2R	PPP	$\Pi$	1		
	FRCS-856	3/2R	P P P	11	1		!
	FRCS-857	3/2R	PPP	11	1		!
	FRCS-858	3/2R	P P P	11			1
	FRCS-859	3/2R	PPP	11			!
	FRCS-860	3/2R	PPP	11	1		!
	FRCS-861	3/2R	PPP		1	!	ļ
	FRCS-862	3/2R	P P P	11	!	!	1
03-2F-121314-1	FRCS-1137	3/1R	P P P	11	į	!	1
	FRCS-1139	3/1R	P P P	11	ļ		
	FRCS-1141	3/1R	PPP	Щ	ļ		1
	FRCS-1143	3/1R	•	11	!		1
03-2F-121314-2	FRCS-1136	3/1R	PPP	11	!	1	1
	FRCS-1138	3/1R	PPP		ļ		1
	FRCS-1140	3/1R	PPP	[]	ļ		1
	FRCS-1142		PPP				
03-2F-121315-1	FRCS-1147		P P P	11			1
	FRCS-1149	3/1R	P P P	!!	ļ		l I
	FRCS-1151	3/1R		11	ļ	1	1
	FRCS-1153	- 11	PPP		1	 	1
03-2F-121315-2	FRCS-1146	3/1R	: _	11	1	1	I I
	FRCS-1148	3/1R			1	1	1
	FRCS-1150	3/1R			l I		1
	FRCS-1152	3/1R			I i	1	1
03-2F-121316-1	FRCS-1209	3/2R	-	11	1	 	Ì
	FRCS-1211	* -		11	1	1	İ
I	FRCS-1213	3/2R	l P P P	11	ļ	1	1
03-2F-121316-2	FRCS-1210	3/3		11			1

IDEN	TIFIERS	N	IASA	11	IOA RECOM	MENDATIONS	•••••
NASA FMEA NUMBER	IOA   ASSESSMENT NUMBER	CRIT    HW/F	SCREENS	CRIT    HW/F	SCREENS	OTHER (SEE LEGEND CODE)	Issu
03-2F-121316-2	FRCS-1212	======    3/3		=  ===== 	:=   ======= 		=====
1	FRCS-1214	3/3	i	ii	i	1	l I
03-2F-121317-1	FRCS-1215	2/2	İ	ii	i	! !	1
03-2F-121317-2	FRCS-1216	3/3	i	ii	i	; [	] 1
03-2F-121345-1	FRCS-1294	3/2R	PPP	ii	İ	! 	1
05-6KF-2001 -1	FRCS-340	3/1R	PPP	ii	i	1	 
1	FRCS-341	3/1R	PPP	ii	İ		1
05-6KF-2003 -1	FRCS-468	]  3/1R	PPP	ii	i	<u> </u>	] 
1	FRCS-469	]  3/1R	P P P	ii	ì	! 	1
05-6KF-2004 -1	FRCS-470	]  3/1R	P P P	ii	i	! 	} 
1	FRCS-471	3/1R	PPP	ii	i	; [	 
05-6KF-2005 -1	FRCS-696	3/1R	PPP	ii	i	! 	<b>↓</b> 
1	FRCS-697	3/1R	PPP	ii	i		l 1
	FRCS-698	3/1R	PPP	ii	i		! !
	FRCS-699	3/1R	PPP	ii	i		
05-6KF-2006 -1	FRCS-11001X	3/2R	PPP	3/1R	PNAP	EPD&C 4	х
	FRCS-11002X	3/2R	PPP	3/1R	P NA P	EPD&C 4	X
05-6KF-2007 -1	FRCS-961	3/1R	PPP	2/1R	PPP	EPD&C 4	X
	FRCS-964	3/1R	PPP	2/1R	P P P	EPD&C 4	X
ļ	FRCS-967	3/1R	PPP	2/1R	PPP	EPD&C 4	Х
	FRCS-969	3/1R	PPP	Ϊİ	i i		
05-6KF-2008 -1	FRCS-960	3/1R	PPP	2/1R	IPPP I	EPD&C 4	X
	FRCS-963	3/1R	PPP	2/1R	I P P P I	EPD&C 4	X
	FRCS-966	3/1R	PPP	2/1R	PPP	EPD&C 4	X
	FRCS-970	3/1R	PPP	2/1R	PPP	EPD&C 4	X
05-6KF-2009 -1	FRCS-959	3/2R	PPP	2/1R	PPP	EPD&C 4	X
	FRCS-962	3/2R	РРР	2/1R	PPP	EPD&C 4	X
	FRCS-965	3/2R	PPP	2/1R	PPP	EPD&C 4	х
05-6KF-2010 -1	FRCS-1196	2/2			i	ļ	
05-6KF-2011 -1		3/2R	PPP	H	1 i		
!		3/2R	PPP	П	1		
	· .	3/2R	PPP		1 1	i	
05-6KF-2011A-1	FRCS-1195	3/2R	PPP	]	1	i	
05-6KF-2012 -1	FRCS-1188	3/2R	PPP	11	1	j	
1	FRCS-1189	3/2R	PPP	11	1 1	j	
	FRCS-1190	3/2R	PPP		1		
1 05 (45 2047 4	FRCS-1191	3/2R	PPP		1	j	
05-6KF-2013 -1	FRCS-1180	3/2R	PPP		1	j	
  -	FRCS-1181	: :	PPP	11	1	Í	
	FRCS-1182	:	PPP	H	1	ĺ	
 	FRCS-1183	: :	PPP		1	İ	
 	FRCS-1184		PPP	ļ	1	Ì	
 	FRCS-1185		PPP		1	i	
<b> </b>	FRCS-1186	3/2R	PPP	1	1	İ	
   05-445-2017   4	FRCS-1187	3/2R	PPP	1	] 1	i	
05-6KF-2017 -1	FRCS-968	2/2		!		İ	
   05.446.2024 -4	FRCS-971	2/2	_	ļ	1	İ	
05-6KF-2026 -1	FRCS-11080X	3/1R	PPP		1 1	İ	

IDENTI	FIERS	N/	ASA			10	A R	ECOM	MENDATIO	NS	
NASA FMEA NUMBER	IOA   ASSESSMENT NUMBER	CRIT	SCRE		CRIT	SCI	REE B	NS C	   (SEE	OTHER Legend code)	ISSUE
05-6KF-2026 -1	FRCS-11084X	======    3/1R	P	) P	======   ]	===: 	* * =	**==	====== 		======
05-6KF-2026 -2	FRCS-11081X	3/1R	:	-		l I P	P	P	i   EPD&C	4	i   x
1		3/1R	P   F		2/1R	l P	Р	Р	EPD&C		X
•	FRCS-11083X	3/1R	I PF		3/3		•	•	EPD&C		ĺx
05-6KF-2028 -1		3/1R	l P F			: 			2,020	•	, ^ 
İ	i	3/1R	PF	P	ii	i			! 		İ
05-6KF-2028 -2	FRCS-11086X	3/1R	РР	P	i	İ			i		i
1	FRCS-11087X	3/1R	P F	) р		İ			i		i
1	FRCS-11088X	3/1R	PP	Р	i i	ĺ			İ		i
05-6KF-2029 -1	FRCS-11090X	3/1R	PP	P		İ					İ
1	FRCS-11094X	3/1R	P P	Р	i i	İ					i
05-6KF-2029 -2	FRCS-11091X	3/1R	P	Р		ĺ					İ
1	FRCS-11092X	3/1R	P P	P							
1	FRCS-11093X	3/1R	P P	P							ĺ
05-6KF-2030 -1	FRCS-11095X	3/1R	PP	P							
	FRCS-11099X	3/1R	PP	P							
	FRCS-11100X	3/1R	PP	Ρ							1
1	FRCS-11104X	3/1R	PP	P							
	FRCS-11105X	3/1R	P P	P							1
1	FRCS-11109X	3/1R	PP	P				-			j l
1	FRCS-11110X	3/1R	P P	P				1			
ļ	FRCS-11114X	3/1R	P P	P				1			
05-6KF-2030 -2	FRCS-11096X	3/1R	P P	P	2/1R	P	P	₽	EPD&C	4	x
!	FRCS-11097X	3/1R	P P	P	2/1R	P	P	Р	EPD&C	4	X
!	FRCS-11098X	3/1R	P P	P	3/3				EPD&C	6	x
!	FRCS-11101X	3/1R	P P	P	2/1R	P	P	Ρ	EPD&C	4	X
	FRCS-11102X	3/1R	P P	P	2/1R	P	Р	Р	EPD&C	4	x
	FRCS-11103X	3/1R	PP	Р	3/3			ļ	EPD&C	<b>5</b>	X
	FRCS-11106X	3/1R	PP		2/1R	P	Р	P	EPD&C		X
•	FRCS-11107X	3/1R	PP		2/1R	Р	Р	P	EPD&C		X
[	FRCS-11108X	3/1R	PP	P	3/3	_	_	_ !	EPD&C		Х
<u> </u> 	FRCS-11111X	3/1R	PP		2/1R				EPD&C		X
1	FRCS-11112X	1			2/1R	Р	P	P	EPD&C		х
   05-6KF-2032 -1	FRCS-11113X FRCS-11003X	3/1R		_ :	3/3	_		_ !	EPD&C	,	X
1		3/2R		P	3/1R		NA	:	EPD&C		X I
<b>∤</b> {	FRCS-11004X   FRCS-11006X			:	3/1R		NA		EPD&C		X
05-6KF-2032 -2		: :			3/1R		NA	:	EPD&C		X
03 OK! 2032 2	FRCS-11005X FRCS-11007X	1 :		P	3/1R		F		EPD&C		X J
05-6KF-2033 -1	FRCS-11190X	:	rr	P	3/1R	,	F	P	EPD&C	>,4	X [
05-6KF-2034 -1	FRCS-11191X	3/3     3/3			1 3/20			l 0 l	EDDIC (	<u> </u>	
05-6KF-2035 -1	FRCS-11115X	: :	P P	P I	3/2R   2/1R		P D	P   P	EPD&C 4		X
	FRCS-11119X	3/1R     3/1R		- :	2/1R   2/1R		P P	PI	EPD&C 4	,	X I
· 	FRCS-11125X	: :		:			P P	P	EPD&C 4		X I
· 	FRCS-11129X	3/1R		_ :	: :		P	P	EPD&C 4		X I
, , 	FRCS-11135X	3/1R			:		r P	P	EPD&C 4		X I
	FRCS-11139X	3/1R		:	: :		r P	P	EPD&C		X I
	FRCS-11145X	3/1R		. , p	3/1R		P	P	L. Dut.	•	^
' ====================================	•			 				•		 	}

IDENTI	FIERS	N/	NASA			IOA RECOMMENDATIONS					
NASA FMEA NUMBER	IOA   ASSESSMENT NUMBER	CRIT HW/F	SCREE!	NS C	CRIT		С	OTHER (SEE LEGEND CODE)	ISSUE		
======================================	=====================================	=======   3/1R	   P P	P	======    3/1R	=====   P P		_======================================	:}===== 		
05-6KF-2035 -2	FRCS-11116X	3/1R	PP	P	3/3	İ		EPD&C 6	j x		
•••••	FRCS-11117X	3/1R	PP	P	3/3	ĺ		EPD&C 6	) x		
	FRCS-11118X	3/1R	PP	P	3/3	İ		EPD&C 6	X		
	FRCS-11126X	3/1R	P P	P	3/3	Ì		EPD&C 6	X		
	FRCS-11127X	3/1R	PP	Ρ	3/3	ĺ		EPD&C 6	x		
	FRCS-11128X	3/1R	PP	Ρ	3/3	1		EPD&C 6	x		
	FRCS-11136X	3/1R	PP	P	3/3	1		EPD&C 6	X		
	FRCS-11137X	3/1R	PP	P	3/3	1		EPD&C 6	X		
	FRCS-11138X	3/1R	PP	Ρ	3/3	1		EPD&C 6	X		
	FRCS-11146X	3/1R	PP	P	3/3	1		EPD&C 6	X		
	FRCS-11147X	3/1R	PP	P	3/3	1		EPD&C 6	X		
	FRCS-11148X	3/1R	PP	P	3/3	1		EPD&C 6	x		
05-6KF-2036 -1	FRCS-11120X	3/1R	PP	P	2/1R	P P	Р	EPD&C 4	x		
	FRCS-11124X	3/1R	PP	P	2/1R	PP	P	EPD&C 4	X		
	FRCS-11130X	]  3/1R	PP	P	2/1R	P P	Р	EPD&C 4	X		
	FRCS-11134X	3/1R	PP	P	2/1R	PF	P	EPD&C 4	X		
	FRCS-11140X	]  3/1R	PP	₽	2/1R	P F	Р	EPD&C 4	x		
	FRCS-11144X	3/1R	PP	P	2/1R	P F	P	EPD&C 4	x		
	FRCS-11150X	3/1R	P P	P	2/1R	P F	P	EPD&C 4	x		
	FRCS-11154X	3/1R	PP	P	2/1R	P P	Р	EPD&C 4	x		
05-6KF-2036 -2	FRCS-11121X	3/1R	I P P	P	3/3			EPD&C 2	X		
	FRCS-11122X	3/1R	PP	P	3/3	1		EPD&C 2	X		
	FRCS-11123X	3/1R	PP	P	3/3			EPD&C 2	X		
	FRCS-11131X	3/1R	P P	P	3/3	1		EPD&C 2	X		
	FRCS-11132X	3/1R	PP	P	3/3			EPD&C 2	X		
	FRCS-11133X	3/1R	PP	P	3/3			EPD&C 2	X		
	FRCS-11141X	3/1R	P P	P	3/3			EPD&C 2	X		
	FRCS-11142X	3/1R	P P	P	3/3	1		EPD&C 2	x		
	FRCS-11143X	3/1R	P P	P	3/3			EPD&C 2	x		
	FRCS-11151X	3/1R	PP	P	3/3			EPD&C 2	X		
	FRCS-11152X	3/1R	P P	P	3/3	İ		EPD&C 2	x		
	FRCS-11153X	3/1R	PP	P	3/3	1		EPD&C 2	X		
05-6KF-2037 -1	FRCS-11160X	3/2R	PP	P	11	1					
	FRCS-11162X	3/2R	P P	P	11	1			ļ		
	FRCS-11164X	3/2R	PP	P	11	1		1	ļ		
	FRCS-11165X	3/2R	PP	P	11	1					
	FRCS-11167X	3/2R	P P	P	11			!	ļ		
	FRCS-11169X	3/2R	PP	P	[]	1		ļ.	1		
	FRCS-11170X	3/2R	PP	P		!		]	!		
	FRCS-11172X	3/2R	PP	P	II .				!		
	FRCS-11174X	3/2R	PP	P	Ш	!			ļ		
	FRCS-11175X	3/2R	P P	P	II.	!			ļ		
	FRCS-11177X	3/2R	PP	P	II .	!		!	ļ		
	FRCS-11179X	3/2R	I P P	P	Ш	!			ļ		
05-6KF-2037 -2	FRCS-11161X	3/3	1		H	]			1		
	FRCS-11163X	3/3	1		[]	ļ.		ļ.	1		
	FRCS-11166X	3/3	1		11	1			1		

F-12

	IDENTIFIERS			IOA RECOMMENDATIONS							
NASA FMEA NUMBER	ASSESSMENT NUMBER		SCREENS	HW/F	SCREENS A B C	OTHER (SEE LEGEND CODE)	ISSUE				
227723722722372372	· .	:	eez#2222225   1	======	====================================		]				
05-6KF-2037 -2	FRCS-11168X	3/3	] ]	 !	! 		i				
	FRCS-11171X	3/3	] 1		! 	! 	İ				
	FRCS-11173X	3/3	1	<b> </b>   <b> </b>	! 1	1	i				
	FRCS-11176X	3/3	! !	]   [	! !	! }	i				
	FRCS-11178X	3/3	 	<b> </b>   1	ł	! [	i				
05-6KF-2038 -1	FRCS-11185X	2/2	i 1		! ]	Ì	<u> </u>				
	FRCS-11187X	2/2    2/2	; 1		1	! 	i				
	FRCS-11189X	2/2    3/3	1	1 I 1 I	! 		i				
05-6KF-2038 -2	FRCS-11186X	3/3    3/3	1 1	   <b> </b>	1	i	i				
as aa. 4	FRCS-11188X	3/3	! 	1 I	i		İ				
05-6KF-2041 -1	FRCS-11155X   FRCS-11159X	1 2/2	i	i i	i	j	1				
AE (ME 30/4 - 2	FRCS-11156X	3/2R	PPP	    3/3	i	EPD&C 2	X				
05-6KF-2041 -2	FRCS-11157X	3/2R	PPP	3/3	i	EPD&C 2	X				
	FRCS-11158X	3/2R	PPP	3/3	İ	EPD&C 2	X				
05-6KF-2042 -1	FRCS-11180X	2/2	i	ii	ĺ	Ì					
U3-0KF-2U42 - 1	FRCS-11182X	1 2/2	1	ii	İ						
	FRCS-11184X	2/2	i	ii	İ		1				
05-6KF-2042 -2	FRCS-11181X	3/3	i	ii	ĺ						
UJ-UKI ZUTE Z	FRCS-11183X	3/3	İ	ii	Í	1	1				
05-6KF-2076 -1	FRCS-342	3/3	i	ii.	1	1	1				
05 OK. 1010 .	FRCS-343	3/3	i	ii	Ì						
	FRCS-344	3/3	i	11	1		ļ				
	FRCS-345	3/3		11	1		ļ				
	FRCS-346	3/3			1	1	!				
	FRCS-347	3/3		11	1	1	1				
05-6KF-2077 -1	FRCS-348	3/3	1	3/2R	PPP	EPD&C 1	i x				
	FRCS-349	3/3	1	11	1	1	]				
	FRCS-350	3/3	1	3/2R	PPP	EPD&C 1	X				
	FRCS-351	3/3	l	11	!		1				
	FRCS-352	3/3	1	3/2R	PPP	EPD&C 1	i x				
	FRCS-353	3/3	1	11	!						
	FRCS-354	3/3	1	3/2R	PPP	EPD&C 1	l x				
	FRCS-355	3/3	ļ				l x				
05-6KF-2078 -1	FRCS-356	3/3	ļ	3/2R	PPP	EPD&C 1	^				
	FRCS-357	3/3			!	1 50000 1	l l x				
05-6KF-2081 -1	FRCS-502	3/3	!	3/2R	PPP	EPD&C 1	1 ^				
	FRCS-503	3/3	ļ	11 7/20		   EPD&C 1	l l x				
	FRCS-506	3/3	1	3/2R	•	EPD&C 1	i x				
	FRCS-510	3/3	!	3/2R	P P P	EPD&G	^				
	FRCS-511	3/3	l 1	7/25		   EPD&C 1	i x				
	FRCS-512	3/3	1	3/2R	PPP	67040	1 ^				
	FRCS-513	3/3	1	    3/2R	I I P P P	   EPD&C 1	i x				
05-6KF-2082 -1	FRCS-504	3/3	 		1						
	FRCS-505	3/3	l I	11	1	1					
	FRCS-507	3/3	l I	    3/2R	I I P P P	EPD&C 1	i x				
	FRCS-508   FRCS-509	3/3	1	3/2K	1	1 51 940 1	1 "				

IDENT	FIERS	N	ASA					ı	OA	RECO	MENDAT I	ONS	••••
NASA FMEA NUMBER	I IOA ASSESSMENT NUMBER		SC				CRIT HW/F	:		ENS C	   (SEE	OTHER LEGEND CODE)	ISSUE
05-6KF-2083 -1	FRCS-496				:==*:	=     =		:			:		=====:
1		3/1R    3/1R	:	F	P P		3/2R	P			EPD&C		X
İ		3/1R	P	-	P	11	3/2R 3/2R	јР ІР	-		EPD&C		X
05-6KF-2083 -2	i	3/3	'	•	r		J/ ER	1	•	P	EPD&C	2	ΙX
i		3/3	1			H		i I			1		  -
i		3/3	1					! !			1		 
05-6KF-2084 -1		3/1R	P	F	P		3/2R	   P	D	Р	I EPD&C	2	
İ	i	3/1R	P		P		3/2R			P	EPD&C		l X
İ	1	3/1R	:	F		H	3/2R	:			EPD&C		X
05-6KF-2084 -2	i	3/3	, · 	•		Н	3, LK		•	•	LFD&C	_	X
1		3/3	i			H	3/2R	!   p	P	Þ	1		
	i	3/3	i			ii	J, Z.	!	•	•	<u> </u>		
05-6KF-2085 -1	FRCS-522	3/3	i			ii	3/2R	i I P	Р	P	EPD&C	1	l x
	FRCS-523	3/3	i			ii		ľ	•	•	1	'	^
	FRCS-526	3/3	i			ii	3/2R	l P	P	P	EPD&C	1	x
1	FRCS-527	3/3				ii	_,	i		•	1	,	^
05-6KF-2086 -1	FRCS-520	3/3				ii	3/2R	P	Р	P	EPD&C	1	×
1	FRCS-521	3/3				ii.		.	•	•	1	· ·	^
1	FRCS-524	3/3				ii	3/2R	P	P	P	EPD&C	1	x
	FRCS-525	3/3				ii	-	i				`	^
1	FRCS-528	3/3				ii .	3/2R	P	P	P	EPD&C	1 1	x
	FRCS-529	3/3				ii				•			^
1	FRCS-530	3/3				ii	3/2R	Р	Р	Р	EPD&C	1	x
1	FRCS-531	3/3				ii	į						
05-6KF-2087 -1	FRCS-720	3/3				ii -	i				i	! !	
	FRCS-721	3/3				İİ	i				İ	: 	
	FRCS-722	3/3				Ï	į				İ	, 	
	FRCS-723	3/3				II	į				İ	ļ	
	FRCS-734	3/3					Ì				j	į	
	FRCS-735	3/3				П	į				j	i	
	FRCS-736	3/3				11	ĺ				ĺ	i	
	FRCS-737	3/3				11	ĺ					i	
	FRCS-748	3/3				П	j					i	
	FRCS-749	3/3				П	j					i	
	FRCS-750	3/3				11	1					i	
	FRCS-751	3/3					1					i	
	FRCS-762	3/3				П	1					į	1
	FRCS-763	3/3					ı				1	į	
05 (WE 2005 1	FRCS-764	3/3				11	I					ļ	į
05-6KF-2088 -1	FRCS-724	3/3				П	3/2R	Ρ	P	P	EPD&C	1 j	x į
	FRCS-725	3/3					- 1					İ	į
	FRCS-726	3/3				П	3/2R	P	P	P	EPD&C	1	x j
	FRCS-727	3/3				Ш	1					j	i
	FRCS-728	3/3				Ш	1			1			i
	FRCS-729	3/3				: :	3/2R	P	P	P	EPD&C	1 j	x i
	FRCS-730	3/3				П	3/2R	P	P	Ρ	EPD&C	1	x į
į	FRCS-731	3/3					ŀ						i
	FRCS-738	3/3				1	3/2R	Ρ	P	P	EPD&C	1	X I

IDENTI	FIERS	N/	NSA			10	A R	ECOM	MENDATIONS	
NASA FMEA NUMBER	ASSESSMENT NUMBER	1	SCREENS	į	CRIT	Ā	_	C	OTHER (SEE LEGEND CODE)	ISSUE
=====================================	=====================================	3/3	:======= 	! ∓: 		=== 	<b>T E</b> E	*===	=====================================	====== 
1	FRCS-740	3/3	! 	i	3/2R	P	Р	Р	   EPD&C 1	i x
! 	FRCS-741	3/3	! 	i	•/	, . 	•	•	1	1 "
	FRCS-742	3/3		i	3/2R	P	Р	P	! EPD&C 1	l x
	FRCS-743	3/3		i	0,0	i .				
	FRCS-744	3/3		i	3/2R	'   Р	Р	P	EPD&C 1	i x
	FRCS-745	3/3		i	i	i			į	i
	FRCS-752	3/3		i	3/2R	P	P	Р	EPD&C 1	j x
	FRCS-753	3/3		i	i	i			İ	i
	FRCS-754	3/3		i	3/2R	P	Р	P	EPD&C 1	X
	FRCS-755	3/3		i	i i	ĺ			İ	ĺ
	FRCS-756	3/3		i	3/2R	Р	P	P	EPD&C 1	j x
	FRCS-757	3/3		İ	İ	İ			Ì	Ì
	FRCS-758	3/3		i	3/2R	P	P	P	EPD&C 1	X
	FRCS-759	3/3		Ì	Ì Ì					İ
	FRCS-766	3/3		İ	3/2R	Р	P	Р	EPD&C 1	X
	FRCS-768	3/3		İ	3/2R	Р	P	Р	EPD&C 1	X
	FRCS-770	3/3		ĺ	3/2R	Р	P	Р	EPD&C 1	X
	FRCS-772	3/3		j	3/2R	P	P	Р	EPD&C 1	X
05-6KF-2089 -1	FRCS-718	2/1R	PFP	ĺ	3/2R	P	P	P	EPD&C 2	X
	FRCS-732	2/1R	PFP	١	3/2R	P	P	Р	EPD&C 2	X
	FRCS-746	2/1R	PFP		3/2R	P	P	P	EPD&C 2	X
	FRCS-760	2/1R	PFP		3/2R	P	P	Р	EPD&C 2	X
05-6KF-2089 -2	FRCS-719	3/3	Ì	-	1					
	FRCS-733	3/3		-	1				1	
	FRCS-747	3/3		1						1
	FRCS-761	3/3		-						
05-6KF-2090 -1	FRCS-11008X	3/1R	P F P	-	3/2R	P	P	P	EPD&C 2	X
05-6KF-2090 -2	FRCS-11009X	3/3		I	1					1
05-6KF-2091 -1	FRCS-11012X	3/3		-	3/2R	P	P	P	EPD&C 1	X
	FRCS-11013X	3/3		-	3/2R	P	P	P	EPD&C 1	X
	FRCS-11014X	3/3		-	3/2R	P	P	P	EPD&C 1	X
	FRCS-11015X	3/3		-	3/2R	P	P	P	EPD&C 1	X
	FRCS-765	3/3		1	!					
	FRCS-767	3/3		-	1					
	FRCS-769	3/3		-	1					
	FRCS-771	3/3		-						1
	FRCS-773	3/3		-	<u> </u>					Į.
05-6KF-2092 -1	FRCS-11010X	3/3		1						
	FRCS-11011X	3/3		-						
05-6KF-2093 -1	FRCS-1012	3/3		-	<u> </u>					
	FRCS-1013	3/3		١						Į.
	FRCS-1044	3/3		١	<u> </u>					
	FRCS-1045	3/3		ļ	<u> </u>					
	FRCS-980	3/3		!	! !					ļ.
	FRCS-981	3/3		ļ	ļ ļ					ļ
	FRCS-996	3/3		ļ	ļ <u> </u>					!
	FRCS-997	3/3		-	1				l	İ

IDEN	TIFIERS	NASA			IOA RECOMMENDATIONS						
NASA FMEA NUMBER	IOA   ASSESSMENT NUMBER	CRIT	SCREENS		CRIT	SCREENS	OTHER (SEE LEGEND CODE)	ISSUE			
	FRCS-1000	======    3/1R	P F P	==	======= 	======== 	:   ===================================				
U3-0KF-2U94 -1	•	3/1R		1	] 	1		1			
		3/1R		1	1 1	1	1	1			
	•	3/1R		i	) 	1	1	1			
	•	3/1R	i IPFP	1	! 1	1	1	1			
05-6KF-2094 -2	•	3/3	, I	1	! 	i	i	İ			
03 OK! 2074 2	*	3/3	! 	i	i	i	1	i			
	•	3/3	, 	i	i	i		i			
	•	3/3	! 	i	i	i		i			
	<u> </u>	3/3	i İ	i	i	i	1	i			
05-6KF-2095 -1		3/3	! }	i	i	i		i			
		3/3		i	ļ	i		i			
	•	3/3		i	Ì	i	i	i			
		3/3	i	i	İ	i	i	i			
		3/3		i	i	i		i			
		3/3	I	i	i	i	i	i			
05-6KF-2096 -1	•	3/3	i	i	i	i	Ì	i			
	•	3/3	i	i	ĺ	i	į	i			
		3/3	i	i	İ	i	İ	i			
		3/3	i	i	İ	i	İ	i			
	•	3/3	İ	i	İ	İ	İ	İ			
		3/3	İ	i	İ	İ	İ	İ			
	· · ·	3/3	i	i	İ	i	j	İ			
	FRCS-1039	3/3	İ	İ	Ì	İ		ĺ			
	FRCS-990	3/3	İ	Ì	İ	İ		1			
	FRCS-991	3/3	1	- 1		1	1	1			
05-6KF-2097 -1	FRCS-1006	3/3	1	- 1	1	1		1			
	FRCS-1007	3/3	1	- 1		1	1	1			
	FRCS-1008	3/3		1	1			1			
	FRCS-1009	3/3		I	1	1	1				
	FRCS-1020	3/3	1	1		1	1	1			
	FRCS-1021	3/3	1	1	1	1	1	1			
	FRCS-1022	3/3	1	1	1	1		1			
	FRCS-1023	]  3/3		1	1	1					
	FRCS-1040	3/3		1	1	1	1	1			
	FRCS-1041	3/3			1						
	FRCS-1042	3/3	ļ		1	1	1				
	FRCS-1043	3/3	!	- [	!	ļ		1			
	FRCS-986	3/3		ļ			1	1			
	FRCS-987	3/3	1	ļ			1	ļ			
	FRCS-992	3/3		إ	!		!	!			
	FRCS-993	3/3		ļ	!			1			
05-6KF-2098 -1	FRCS-1004	3/3		ļ	!	!		!			
	FRCS-1005	3/3	1	ļ	!			!			
	FRCS-1014	3/3	ļ	!	!	ļ	1	!			
	FRCS-1015	3/3	I	ļ	!		!	!			
	FRCS-1018	3/3	!	ļ	Į.	1		1			
	FRCS-1019	3/3	1	I		1	ŀ	1			

IDENTI	FIERS	N/	<b>NSA</b>			IOA RECOMP	IENDATIONS	
NASA FMEA NUMBER	IOA     ASSESSMENT NUMBER	CRIT	SCREENS A B C	::	CRIT	SCREENS	OTHER (SEE LEGEND CODE)	I SSUE
222222222222222222222	=====================================	3/3	======================================	= 	:   =====: }			
05-6KF-2098 -1	FRCS-1027	3/3	! 	ii	i			
	FRCS-1027	3/3	1 1	ii	i			
	FRCS-1033	3/3	1 1		i			
	FRCS-1046	3/3	, 	ii	i		<u> </u>	
	FRCS-1047	3/3	i	ii	i			
	FRCS-1048	3/3	1	ii	i			
	FRCS-1049	3/3	i	ii.	ĺ			
	FRCS-982	3/3	1	ii	ĺ			
<u> </u>	FRCS-983	3/3	i	ii	i		1	
	FRCS-984	3/3	i	ii	İ			ļ
 	!	3/3	i	ii.	į			
<b> </b> 	!	3/3	i	ii	į			
} 1	FRCS-999	3/3	i	11	ĺ		!	
   05-6KF-2099 -1	FRCS-1237	3/3	i	Ϊİ	1			
1	FRCS-1238	;;    3/3	İ	İÌ	!			
! 	FRCS-1239	3/3	į	П	1			
! 	FRCS-1240	3/3	İ	11	1			
	•	3/3	İ	11	]		1	
! !	•	3/3	Ì	11				1
! 	FRCS-1243	3/3	Ì	11	l		1	]
; 	FRCS-1244	3/3	1	11	İ		1	ļ
, 	FRCS-1245	3/3	1	11	1			!
, 	FRCS-1246	3/3	1	-11				ļ
05-6KF-2100 -1	FRCS-1225	3/3	1	11			!	!
i	FRCS-1226	3/3	1	11				ļ
	FRCS-1233	3/3		11			ļ.	ļ
	FRCS-1234	3/3	1	-11		l	1	ļ.
05-6KF-2101 -1	FRCS-1221	3/2R	PPP	11				!
İ	FRCS-1223	3/2R	P P P	11				
İ	FRCS-1231	3/2R	P P P	Ш		!		
	FRCS-1235	3/2R	P P P	Ш		!		
05-6KF-2101 -2	FRCS-1222	3/3	1	Ш		!		ļ
	FRCS-1224	3/3	!	11		1		l i
İ	FRCS-1232	3/3	1	Ш		<u> </u>	1	1
1	FRCS-1236	3/3	!	- ! !			i	1
05-6KF-2109 -1	FRCS-1050	3/3	ļ	- !!		1		1
	FRCS-1051	3/3	1	- [ ]		1	1	1
	FRCS-1054	3/3	1	11	 !	1	1	1
1	FRCS-1055	3/3	1		i 1	1	1	1
05-6KF-2110 -1	FRCS-1052	3/3	1	П	 	l 1	 	1
	FRCS-1053	3/3	1	- []	! !	1	 	
	FRCS-1056	3/3	l l		 	1	1	i
1	FRCS-1057	3/3		11	 	1	1	i
05-6KF-2111 -1	FRCS-1034	3/2R	:	11	1 2/2	 	   EPD&C 4	X
05-6KF-2113A-1	FRCS-11032X	3/2R	:		2/2	1	EPD&C 2,4	i x
05-6KF-2113A-2	FRCS-11033X	3/1R	:		3/3 2/1R	i IPPP	EPD&C 4	X
05-6KF-2126 -1	FRCS-472	3/1R	IFFF	ı	2/ IK	1	1 2,540 4	

IDENT:	IFIERS		ASA	!!	IOA RECON	MENDATIONS	*
NASA FMEA NUMBER	IOA   ASSESSMENT NUMBER	CRIT	SCREENS A B C	    CRIT    HW/F	SCREENS	OTHER (SEE LEGEND CODE)	188UE
05-6KF-2126 -1	FRCS-478	=======    3/1R	P P P	======    2/1R	====================================	=======================================	!
05-6KF-2126 -2	FRCS-473	2/1R	PFP	2/1R		EPD&C 4	X
	FRCS-479	2/1R	PFP	3/1R		EPD&C 3	l x
05-6KF-2126A-1	FRCS-474	3/1R	PPP		PPP	EPD&C 3	l x
	FRCS-476	3/1R	PPP		1		!
	FRCS-480	3/1R	PPP		! !	1	
	FRCS-482	3/1R	PPP		, 	1	
05-6KF-2126A-2	FRCS-475	3/1R	PFP	3/3	; [	EDD&C 3	   ,,
	FRCS-477	3/1R	PFP	2/1R	l   PFP	EPD&C 2	X
	FRCS-481	3/1R		3/3	F F F	EPD&C 3,4	Х
	FRCS-483	: :	PFP	2/1R	!   P F P	EPD&C 2	X
05-6KF-2127 -1	FRCS-486	3/1R	PPP	1 2/16	,	EPD&C 3,4	Х
	FRCS-488	3/1R	PPPI	1	l I	<u> </u>	
	FRCS-492	3/1R	PPP	1	!	!	
	FRCS-494	:	!	-		 	
05-6KF-2127 -2	FRCS-487			· .		   EPD&C 2	
	FRCS-489		PFP		PFP	EPD&C 3.4	X
	FRCS-493	2/1R	PFP		F F F	: '	X
	FRCS-495	2/1R	PFP		PFP	EPD&C 2	X
05-6KF-2127A-1	FRCS-484		PPP	:		EPD&C 3,4	X
05-6KF-2127A-2	FRCS-490			2/1R		EPD&C 4	X
	FRCS-485	2/1R		3/1R	PPP	EPD&C 4	X
	FRCS-491		•	3/1R	PPP	EPD&C 3	X
05-6KF-2128 -1	FRCS-704	3/1R		, 3/1K j	FFF	EPD&C 3	×
	FRCS-708	3/1R	•	; ;   ;		!	
	FRCS-712	3/1R	•	!		!	
	FRCS-716	3/1R		! ! ! !	i	!	
05-6KF-2128 -2	FRCS-705	2/1R		2/1R	P P P	Ennic 3 /	
	FRCS-709	2/1R		2/1R		EPD&C 2,4   EPD&C 2,4	X
j	FRCS-713	2/1R	PFP	2/1R	,	EPD&C 2,4	X
İ	FRCS-717	2/1R	PFPI	2/1R	PPPI	•	X
05-6KF-2128A-1	FRCS-702	3/1R	PPPI	2/1R	PPPI	EPD&C 2,4	X
İ	FRCS-706	3/1R		2/1R		EPD&C 4	X
}	FRCS-710	3/1R		2/1R	,	EPD&C 4	X
ĺ	FRCS-714	3/1R		2/1R		EPD&C 4	X
05-6KF-2128A-2	FRCS-703	•	• •	3/1R	•	EPD&C 3	X
İ	FRCS-707		1.1	•		EPD&C 3	X
	FRCS-711		• •	3/1R	•	EPD&C 3	X
	FRCS-715		PFP	3/1R		EPD&C 3	X
05-6KF-2130 -1	FRCS-972		P	2/1R		EPD&C 4	X
į	FRCS-974		PPP	2/1R		EPD&C 4	X
ĺ	FRCS-976		P P P	2/1R		EPD&C 4	X
05-6KF-2130 -2	FRCS-973		P P	3/3		EPD&C 2	X
Ì	FRCS-975	:	PPP	3/3	1	EPD&C 2	X
İ	FRCS-977		P P P	3/3	1	EPD&C 2	X
05-6KF-2131 -1	FRCS-1217		PPP		!	TI DWG E	Х
İ	FRCS-1219		P P P	i	1	1	į
05-6KF-2131 -2	FRCS-1218	3/3	11	i i	!	1	

IDENTI	FIERS	ļ N	ASA				01	A RI	ECOMI	MENDATI	ONS	
NASA FMEA NUMBER	IOA     ASSESSMENT NUMBER	CRIT	SC   A	REE		    CRIT    HW/F	!	REE!		   (SEE	OTHER LEGEND CODE)	ISSUE
		======	*===	===	====	======	===	===:	===		********	
05-6KF-2131 -2	FRCS-1220	3/3	l			ii .	ĺ					į į
05-6KF-2151 -1	FRCS-387	3/3	ĺ			3/2R	P	P	P	EPD&C	1	x
05-6KF-2153 -1	FRCS-879	3/3				3/2R	P	P	P	EPD&C	1	j x
05-6KF-2154 -1	FRCS-879A	3/3	ĺ			3/2R	P	P	P	EPD&C	1	X
05-6KF-2155 -1	FRCS-880	2/1R	P	F	P	3/2R	P	Ρ	Ρ	EPD&C	2	x
İ	FRCS-881	2/1R	P	F	P	3/2R	P	P	P	EPD&C	2	į x i
1	FRCS-882	2/1R	P	F	P	3/2R	P	P	P	EPD&C	2	j x j
	FRCS-883	2/1R	P	F	P	3/2R	į P	Ρ	Ρ	EPD&C	2	j x
05-6KF-2155 -2	FRCS-880A	3/3	i			3/2R	į p	P	P	EPD&C	1	j x j
İ	FRCS-881A	3/3	İ			3/2R	Р	P	P	EPD&C	1	j x
İ	FRCS-882A	3/3	i			3/2R	P	P	P	EPD&C	1	X
İ	FRCS-883A	3/3	i			3/2R	P	P	Р	EPD&C	1	i x i
05-6KF-2156 -1	FRCS-11017X	3/1R	P	F	Р	3/2R	P	P	P	EPD&C	2	i x
05-6KF-2156 -2	FRCS-11016X	3/3	i			3/2R	P	P	P	EPD&C	1	x
05-6KF-2157 -1	FRCS-11192X	3/3	i			ii	i					i
05-6KF-2158 -1	FRCS-11193X	3/3	İ			3/2R	P	P	₽	EPD&C	6	İx
İ	FRCS-11194X	3/3	i			3/2R	P	Ρ	P	EPD&C	6	i x i
05-6KF-2176 -1	FRCS-308	3/1R	P	Р	P	ii	i					i i
i	FRCS-312	3/1R	P	Р	Р	ii	i					i i
05-6KF-2176 -2	FRCS-309	3/1R	P	Р	P		i					i i
i i	FRCS-313	3/1R	P	Р	Р	ii	i					
05-6KF-2176A-1	FRCS-310	3/1R	I P	Р	Р		i					İ
i	FRCS-314	3/1R	P	Р	P		i					
05-6KF-2176A-2	FRCS-311	3/3	i I			i	i					İ
i	FRCS-315	3/3	ĺ			ii	i					i i
05-6KF-2177 -1	FRCS-11018X	3/2R	Р	Ρ	Р	3/1R	P	NA	Р	EPD&C	4	i x i
05-6KF-2177 -2	FRCS-11019X	3/1R	Р	F	Р	3/3	i			EPD&C	2	i x i
05-6KF-2178 -1	FRCS-11020X	3/2R	Р	P	P	2/2	Ì			EPD&C	4	i x i
05-6KF-2178 -2	FRCS-11021X	3/1R	P	F	P	3/3	i			EPD&C	2	i x i
05-6KF-2179 -1	FRCS-885	3/1R	P	P	Р	2/1R	P	P	Р	EPD&C	4	i x i
i	FRCS-889	3/1R	P	P	P	2/1R	P	Р	P	EPD&C	4	i x i
į i	FRCS-893	3/1R	P	Р	P	i	i					i
j i	FRCS-904	3/1R	P	Ρ	P	2/1R	P	Р	P	EPD&C	4	x
05-6KF-2179 -2	FRCS-886	3/1R	P	F	P	3/3	ĺ			EPD&C	2	i x i
İ	FRCS-890	3/1R	P	F	P	3/3	ĺ			EPD&C	2	i x i
i i	FRCS-894	3/1R	P	F	Р	3/3	i		Ì	EPD&C	2	i x i
j	FRCS-901	3/1R	P	F	P	3/3	İ		Ì	EPD&C	2	i x i
05-6KF-2180 -1	FRCS-887	3/1R	P	P	Р	2/1R	P	P	P	EPD&C	4	i x i
į i	FRCS-891	3/1R	P	P	P	2/1R	P	P	P	EPD&C	4	x
1	FRCS-895	3/1R	P	P	Р	İ	İ		Ì			İ
ļ	FRCS-902	3/1R	P	P	P	2/1R	P	P	P	EPD&C	4	i x i
05-6KF-2180 -2	FRCS-888	3/3	Ì			ı	İ		i			i i
İ	FRCS-892	3/3				i	İ		i			. '
	FRCS-896	3/3				İ	İ		i			į i
į	FRCS-903	3/3				İ	ĺ		i			i
05-6KF-2181 -1	FRCS-897	3/1R	P	P	P	İ	ĺ		i			
05-6KF-2181 -2	FRCS-898	3/3				1	ĺ		ì			i
05-6KF-2182 -1	FRCS-899	3/1R	P	P	P	i	İ		i			; ;
,							•					

IDEN	TIFIERS		ASA	11	IOA RECOMMENDATIONS							
NASA FMEA NUMBER	IOA   ASSESSMENT NUMBER	CRIT	SCREENS	CRIT    HW/F	SCREENS	OTHER	ISSUE					
05-6KF-2182 -2	FRCS-900	    3/1R	PPP	3/3		EPD&C 2	x					
05-6KF-2183 -1	FRCS-905	2/2	1		1	1	1					
	FRCS-907	2/2	1	11	1		1					
05-6KF-2183 -2	FRCS-906	3/2R	PFP	3/3	1	EPD&C 2	x					
	FRCS-908	3/2R	PFP	3/3	1	EPD&C 2	x					
05-6KF-2201 -1	FRCS-336	3/3	1	3/2R	PPP	EPD&C 1	X					
05-6KF-2201 -2	FRCS-337	3/1R	PPP	11	1							
05-6KF-2201A-1	FRCS-334	3/3	1	3/2R	PPP	EPD&C 1	X					
05-6KF-2201A-2	FRCS-335	3/1R	PPP	11	1		1					
05-6KF-2202 -1	FRCS-330	3/1R	PPP	11	1		1					
	FRCS-332	3/1R	PPP	11	!		1					
05-6KF-2202 -2	FRCS-331	3/1R	PPP	11	!	1						
	FRCS-333	3/1R	P P P	11	l		1					
05-6KF-2202A-1	FRCS-328	3/1R	P P P	11	ļ	1	!					
	FRCS-338	3/1R	PPP	11	1							
05-6KF-2202A-2	:	3/3	ļ	11	ļ	!						
	FRCS-339	3/3	ļ	!!	!	!						
05-6KF-2206 -1		3/3	!	3/2R	PPP	EPD&C 1	X					
	FRCS-462	3/3	!	3/2R	PPP	EPD&C 1	X					
05-6KF-2206 -2		3/3	!	3/2R	P P P	EPD&C 1	Х					
		3/3	!	3/2R	P P P	EPD&C 1	X					
05-6KF-2207 -1		3/3	:	3/2R	PPP	EPD&C 1	X					
		3/3	!	3/2R	PPP	EPD&C 1	X					
05-6KF-2207 -2		3/3	!	3/2R	PPP	EPD&C 1	X					
		3/3		3/2R	PPP	EPD&C 1	X					
05-6KF-2208 -1	FRCS-668	2/1R	P F P	3/2R	PPP	EPD&C 2	X					
	FRCS-670	2/1R	PFP	3/2R	PPP	EPD&C 2	X					
	FRCS-672	2/1R	PFP	3/2R	P P P	EPD&C 2	X					
	FRCS-674	2/1R	PFP	3/2R	PPP	EPD&C 2	X					
	<u>.</u>	2/1R	PFP	3/2R	P P P	EPD&C 2	X					
	FRCS-678	2/1R	PFP	3/2R	P P P	EPD&C 2	X					
	FRCS-680	2/1R	PFP	3/2R	PPP	EPD&C 2	X					
05-6KF-2208 -2	:	2/1R	:	::	PPP	EPD&C 2   EPD&C 4	X					
03-0KF-2200 -2		3/1R    3/1B		2/1R	P P P	EPDAC 4	X					
	·	3/1R    3/1R	-	    2/1R	   P P P	   EPD&C 4	   v					
			i	11	P P P	1	X					
		3/1R    3/1R		    2/1R	!   P P P	   EPD&C 4	i x					
		3/1R			,	I ELDEC 4	1 ^					
	:	3/1R	:	    2/1R	   P P P	EPD&C 4	1 x					
		3/1R	•			1	^					
05-6KF-2210 -1	:	3/1R	-	    3/2R	!   P P P	   EPD&C 2	i x					
05-6KF-2210 -2	:	3/1R		3/28	1	EPD&C 4	l x					
05-6KF-2210A-1		3/1R		3/2R	   P P P	EPD&C 2	i x					
05-6KF-2210A-2	:	3/1R    3/2R	•	3/1R	-	EPD&C 4	i x					
05-6KF-2211 -1		3/2R	-	2/2	i	EPD&C 4	İx					
05-6KF-2211 -2		3/1R	-	3/3	i	EPD&C 2	i x					
05-6KF-2212 -1	FRCS-11028X	3/2R	:	3/1R	PNAP	EPD&C 4	X					

IDEN	TIFIERS	N/	ASA				10	A R	ECOM	MENDATI	ons	
NASA FMEA NUMBER	IOA   Assessment Number	CRIT	SCI	REE!	NS C	CRIT    HW/F	SC   A		NS C		OTHER LEGEND CODE)	ISSUE
05-6KF-2212 -2	FRCS-11029X	3/1R	P	F	P	3/1R	P	NA	P	EPD&C		i x
05-6KF-2213 -1	FRCS-11026X	3/2R	P	P	P	3/1R	P	NA	P	EPD&C	4	X
05-6KF-2213 -2	FRCS-11027X	3/1R	P	F	P	3/3				EPD&C	2	X
05-6KF-2214 -1	FRCS-947	3/1R	P	P	P	2/1R	P	P	P	EPD&C	4	X
	FRCS-949	3/1R	P	P	P	2/1R	P	₽	P	EPD&C	4	X
	FRCS-951	3/1R	P	P	P							
	FRCS-953	3/1R	P	P	P							
	FRCS-956	3/1R	P	P	P	2/1R	P	P	Ρ	EPD&C	4	X
05-6KF-2214 -2	FRCS-948	3/1R	P	F	P	3/3	1			EPD&C	2	x
	FRCS-950	3/1R	P	F	P	3/3				EPD&C	2	X
	FRCS-952	3/1R	P	F	P	3/3				EPD&C	2	X
	FRCS-954	3/1R	P	F	P	3/3				EPD&C	2	X
	FRCS-955	3/1R	P	F	P	3/3	1			EPD&C	2	x
05-6KF-2215 -1	FRCS-1156	3/2R	P	P	P							
	FRCS-1158	3/2R	P	P	P							1
	FRCS-1160	3/2R	P	P	P		1					
	FRCS-1162	3/2R	P	P	P		l					
	FRCS-1164	3/2R	P	P	P		1					
	FRCS-1166	3/2R	P	P	P							
	FRCS-1168	3/2R	P	P	P							
	FRCS-1170	3/2R	P	P	P		[					
	FRCS-1172	3/2R	P	P	P							
	FRCS-1174	3/2R	P	P	P		1					
	FRCS-1176	3/2R	P	P	P					[		
	FRCS-1178	3/2R	P	P	P							
05-6KF-2215 -2	FRCS-1157	3/3				3/2R	P	P	Ρ	EPD&C	6	x
	FRCS-1159	3/3				3/2R	Р	P	Р	EPD&C	6	x
	FRCS-1161	3/3				3/2R	P	P	P	EPD&C	6	X
	FRCS-1163	3/3				3/2R	P	P	P	EPD&C	6	x
	FRCS-1165	3/3				3/2R	P	P	P	EPD&C	6	X
	FRCS-1167	3/3				3/2R	P	P	P	EPD&C	6	x
	FRCS-1169	3/3				3/2R	•	P	Р	EPD&C		x
	FRCS-1171	3/3				3/2R	•	P	Р	EPD&C		X
	FRCS-1173	3/3	l			3/2R	•	P	Р	EPD&C		X
	FRCS-1175	3/3				3/2R	•	P	P	EPD&C		X
	FRCS-1177	3/3	[			3/2R	P	P	Р	EPD&C		X
	FRCS-1179	3/3	!			3/2R	P	P	P	EPD&C	6	X
05-6KF-2220 -1	FRCS-957	2/2			_		!				_	!
05-6KF-2220 -2	FRCS-958	3/2R	P		P	3/3	l			EPD&C		X
05-6KF-2224 -1	FRCS-11034X	3/2R	P	P		2/2	l			EPD&C		X
05-6KF-2224 -2	FRCS-11035X	3/1R	P			3/3				EPD&C	2	X
05-6KF-2251 -1	FRCS-316	3/1R		NA			l					
	FRCS-318	3/1R	P	NA	P		l					!
05-6KF-2251 -2	FRCS-317	3/3	ļ							ļ		1
	FRCS-319	3/3		_	_		!					
05-6KF-2252 -1	FRCS-320	3/1R	P	-	P		ļ			ļ		1
<b>AB</b> 444 <b>AB</b> 5	FRCS-322	3/1R	P			    <b>-</b> :-	ļ				•	
05-6KF-2252 -2	FRCS-321	3/1R	P	F	P	3/3	Ī			EPD&C	۷	X

IDE	NTIFIERS	N	ASA		IOA RECOM	MENDATIONS	
NASA FMEA NUMBER	IOA   ASSESSMENT NUMBER	CRIT	SCREENS	CRIT     HW/F	SCREENS	OTHER   (SEE LEGEND CODE)	ISSUE
05-6KF-2252 -2	FRCS-323	3/1R	P F P	3/3		EPD&C 2	X
05-6KF-2252 -3	FRCS-11211X	3/1R	PFP	3/1R	PNAP	EPD&C 3	X
İ	FRCS-11212X	3/1R	PFP	3/1R	PNAP	EPD&C 3	X
05-6KF-2253 -1	FRCS-388	2/1R	PFP	3/3	Ì	EPD&C 2	X
1	FRCS-406	2/1R	PFP	3/3	İ	EPD&C 2	X
İ	FRCS-410	2/1R	P F P	3/3	1	EPD&C 2	X
	FRCS-420	2/1R	P F P	3/3	[	EPD&C 2	X
05-6KF-2253 -2	FRCS-389	3/3	ļ		1		
	FRCS-407	3/3	1		!		1
	FRCS-411	3/3	I	H	1	1	
	FRCS-421	3/3	1		1		
05-6KF-2253A-1	FRCS-402	3/3	1	11	1		
	FRCS-404	3/3	1		1		
	FRCS-422	3/3	1	H	1		İ
05-6KF-2253A-2	FRCS-403	3/3	1	H	1		1
	FRCS-405	3/3	1		1		1
	FRCS-423	3/3	1		1	[	1
05-6KF-2253B-1	FRCS-398	3/2R	P P P	3/1R	P NA P	EPD&C 6	x
	FRCS-400	3/2R	P P P	3/1R	PNAP	EPD&C 6	x
05-6KF-2253B-2	FRCS-399	3/3	1	11	1		
	FRCS-401	3/3	1	11	1	1	
05-6KF-2253C-1	FRCS-390	3/1R	P P P		I	}	1
	FRCS-392	3/1R	PPP	11	1	1	1
05-6KF-2253C-2	FRCS-391	3/3	1		1		1
	FRCS-393	3/3		11	1		
05-6KF-2253D-1	FRCS-396	3/1R	PPP	11		1	1
1	FRCS-414	3/1R	PPP				1
	FRCS-416	3/1R	PPP	11	1		1
05-6KF-2253D-2	FRCS-397	3/3		11			1
	FRCS-415	3/3	ŀ				1
1	FRCS-417	3/3	1	11	1	}	1
05-6KF-2253E-1	FRCS-408	3/1R	PPP	3/3	1	EPD&C 2	x
1	FRCS-418	3/1R	PPP	3/3	1	EPD&C 2	x
05-6KF-2253E-2	FRCS-409	3/3	1	11	1		1
	FRCS-419	3/3	1		1	1	1
05-6KF-2253F-1	FRCS-394	3/3	1	11			1
	FRCS-412	3/3	1				1
05-6KF-2253F-2	FRCS-395	3/3	1	[]			1
	FRCS-413	3/3	1				I
05-6KF-2254 -1	FRCS-424	2/1R		3/3	1	EPD&C 2	X
1	FRCS-442	2/1R	T	3/3	Į.	EPD&C 2	X
	•		•	3/3	ļ	EPD&C 2	x
ļ			PFP	3/3	ļ	EPD&C 2	x
05-6KF-2254 -2		3/3	!	<u> </u>	!		ļ
<u> </u>	•	3/3	ļ		1		I
	FRCS-447	3/3	!	!!	ļ.	!	!
	FRCS-459	3/3	!	!!	!	!	!
05-6KF-2254A-1	FRCS-438	3/3	I	11	Ī	1	1

IDEN1	TIFIERS	N/	ASA					[0	A RECOMI	MENDATIONS	
NASA FMEA NUMBER	IOA ASSESSMENT NUMBER	. •	SCR   A				CRIT   HW/F	A	ВС	OTHER (SEE LEGEND CODE)	ISSUE    -======
=====================================	==   =================================	    3/3	 								
	FRCS-458	3/3	1			П	ļ				
05-6KF-2254A-2	FRCS-439	3/3				Ш	ļ			-	 
	FRCS-441	3/3	1			Ц	ļ				1
İ	FRCS-457	3/3				П				1	
05-6KF-2254B-1	FRCS-434	3/2R			P	Ш	3/1R	P		EPD&C 6	ļ Х I X
	FRCS-436	3/2R	P	P	P	Ц	3/1R	Р	NA P	EPD&C 6	1 ^
05-6KF-2254B-2	FRCS-435	3/3	1			Ш	ļ			1	1
	FRCS-437	3/3	!			!!	ļ				1
05-6KF-2254C-1	FRCS-426	3/1R	P	P	P	Ц					] ]
1	FRCS-428	3/1R	P	Р	Р	Ш				!	! 
05-6KF-2254C-2	FRCS-427	3/3	!			Ш	1				] 
	FRCS-429	3/3	! _	_	_	11	1			1	1 1
05-6KF-2254D-1	FRCS-432	3/1R	P	P	P						l I
!	FRCS-450	3/1R	P	P	_	11	ļ				1 1
1	FRCS-452	3/1R	Į P	Р	Р	!!		 			! 
05-6KF-2254D-2	FRCS-433	3/3	ļ			Ш		 			1
	FRCS-451	3/3	ļ			!!	!				1
1	FRCS-453	3/3	ļ			!!				1	1
05-6KF-2254E-1	FRCS-444	3/3	!			Ш				1	1
1	FRCS-454	3/3	ļ			Ц					k I
05-6KF-2254E-2	FRCS-445	3/3	ļ.			Ш					1
	FRCS-455	3/3	!			11				1	1
05-6KF-2254F-1	FRCS-430	3/3	!					  -			1
1	FRCS-448	3/3	!					 		j i	1
05-6KF-2254F-2	FRCS-431	3/3	!					] 1		1	1
1	FRCS-449	3/3		_	_		7/7	 		   EPD&C 2	i x
05-6KF-2255 -1	FRCS-572	2/1R	P	F	P	1	3/3	i 1		EPD&C 2	i x
1	FRCS-578	2/1R	P	F	P	1	3/3	ļ		EPD&C 2	i x
1	FRCS-594	2/1R	P	F	P	1	3/3	 		EPD&C 2	i x
1	FRCS-600	2/1R	P	-	ν .	ŀ	3/3			EPD&C 2	i x
	FRCS-616	2/1R	•	F		I	3/3	i 1		EPD&C 2	i x
1	FRCS-622	2/1R	1	F	P	1	3/3   3/3	! !		EPD&C 2	i x
]	FRCS-638	2/1R	•	r	P P	!	3/3	 		EPD&C 2	i x
	FRCS-644	2/1R	1	r	r	1		!   P	P P	EPD&C 1	i x
05-6KF-2255 -2	FRCS-573	3/3	1			1	3/2R	:		EPD&C 1	i x
	FRCS-579	3/3	1			i		1		EPD&C 1	ίx
	FRCS-595	3/3	-				·	:		EPD&C 1	i x
1	FRCS-601	3/3	1			1		:		EPD&C 1	X
!	FRCS-617	3/3	1				:	P		EPD&C 1	X
!	FRCS-623	3/3	l I			1	3/2R	:	_	EPD&C 1	j x
1	FRCS-639		1			ı	3/2R	l P		EPD&C 1	x
1 05 445 3355: 1	FRCS-645	3/3	1			i	:	Ι.			i
05-6KF-2255A-1	FRCS-584	3/3	1			1				i	i
Į	FRCS-586	3/3	ļ					i		i	i
ļ	FRCS-606   FRCS-608	3/3	1			i		i		i	i
1	•	3/3	i I			- 1	i	i		i	i
1	FRCS-628	• •	ı							 	========

IDENTI	FIERS	N	ASA			١	!	10	OA	RECO	MMENDATIONS	
NASA FMEA NUMBER	IOA   ASSESSMENT NUMBER	CRIT     HW/F	S	CRE B	ENS C	-	CRIT	:	CRE B	ENS C	OTHER	ISSUE
05-6KF-2255A-1	FRCS-630	======    3/3	*==:	226	====	=   -	=======	==:	===	2222		======
	FRCS-650	3/3	i			i	1 				1	ļ
	FRCS-652	3/3	i			1	! 	 			1	1
05-6KF-2255A-2	FRCS-585	3/3	i			i	! 	! !			!	!
	FRCS-587	3/3	i			i	! 	1			1	!
	FRCS-607	3/3	i			i	, I	! !			1	1
	FRCS-609	3/3	i			i	! 	; 			1	]
	FRCS-629	3/3	i			i	! !	! }			1	1
	FRCS-631	3/3	i			i	! !	! 			1	1
	FRCS-651	3/3	i			i	! 	l I				1
	FRCS-653	3/3	i			i						!
05-6KF-22558-1	i :	3/2R	P	P	Ρ		3/1R	P	N/	N P	EPD&C 6	l x
		3/2R	P	Ρ	P	i	3/1R			 N P	EPD&C 6	l x
	FRCS-618	3/2R	P	P	Р	i	3/1R			\ P	EPD&C 6	l x
	FRCS-640	3/2R	P	Р	P	i	3/1R	P		. P	EPD&C 6	i x
05-6KF-2255B-2	FRCS-575	3/3	i			ii	.,			•	1	. ^
	FRCS-597	3/3				П					† 	1
	FRCS-619	3/3	İ			ii					1	i 1
	FRCS-641	3/3	İ			ii	1				1	1
05-6KF-2255C-1	FRCS-570	3/1R	Р	Р	P	H	ì				[ ]	1
	FRCS-592	3/1R	P	P	P	ii	i				} 	] 
	FRCS-614	3/1R	Р	P	P		ľ				1	 
	FRCS-636	3/1R	P	P	P		, 				! {	] 
05-6KF-2255C-2	FRCS-571	3/3		·	•		!				! 	 
	FRCS-593	3/3				ii	1				፤ 	 
İ	FRCS-615	3/3				ii	;				! 	} 
İ	FRCS-637	3/3				li	i				! 	 
05-6KF-2255D-1	FRCS-588	3/1R	Ρ	Р	Р	Н	;				1 1	 
į	FRCS-610	3/1R	P	P	P	н	ľ				[ [	i I
İ	FRCS-632	3/1R	Р	P	P	H	i				† 	! !
İ	FRCS-654	3/1R	P	P	P		1				! 1	i
05-6KF-22550-2	FRCS-589	3/3				ii	í				 	
İ	FRCS-611	:				li						
į	FRCS-633	3/3				ii						
İ	FRCS-655					ii	i					
05-6KF-2255E-1	FRCS-576	3/1R	P	F	P	ii	3/3				EPD&C 2	. Vr
į	FRCS-598	3/1R	P	F	P	ii	3/3				EPD&C 2	X X
İ	FRCS-620	3/1R	Р	F	P	ii	3/3				EPD&C 2	X
j	FRCS-642	3/1R	P	F	P	ii	3/3				EPD&C 2	X
05-6KF-2255E-2	FRCS-577	3/1R	P	F	Р	ii	2/1R	P	F	P	EPD&C 3,4	x
j	FRCS-599	3/1R	P	F	P	ii	2/1R	P	F	Р	EPD&C 3,4	X
İ	FRCS-621	3/1R	Ρ	F	P	ii	2/1R	P		P	EPD&C 3,4	X I
ĺ	FRCS-643	3/1R	Р	F	P	ii	2/1R	P		P	EPD&C 3,4	x 1
05-6KF-2255F-1	FRCS-568	3/1R	P	F	P	ii	3/3	-	-		EPD&C 2	X I
Ì	FRCS-590	3/1R	P	F		ii	3/3			i	EPD&C 2	X I
Ì	FRCS-612	3/1R	P	_		ii	3/3			i	EPD&C 2	x i
į	FRCS-634	3/1R	P			ii	3/3				EPD&C 2	X I
•												

IDENTI	IERS	N/	\SA				10	A R	ECOM	4ENDATI	ONS	 
NASA   FMEA NUMBER	IOA     ASSESSMENT NUMBER	CRIT	A	REE B	NS C		į a	REE B			OTHER LEGEND CODE)	ISSUE      -=====
05-6KF-2255F-2	FRCS-591	3/1R	P	F	P	2/1R	P		P	EPD&C		i x i
1	FRCS-613		Р	F	P	2/1R	Р	F	P	EPD&C	3,4	j x j
i	FRCS-635	3/1R	P	F	Р	2/1R	į Р	F	P	EPD&C	3,4	j x j
05-6KF-2257 -1	FRCS-11036X	3/1R	Р	F	Р	3/3	İ			EPD&C	2	x
05-6KF-2257 -2	FRCS-11037X	3/3	ĺ			3/2R	ĺР	P	P	EPD&C	1	x
05-6KF-2257A-1	FRCS-11038X	3/1R	P	F	Р	3/3	İ			EPD&C	2	x
05-6KF-2257A-2	FRCS-11039X	3/3	ĺ			3/2R	P	P	P	EPD&C	1	x
05-6KF-2257B-1	FRCS-11048X	3/2R	P	P	Ρ	ii	İ			ĺ		l l
i	FRCS-11052X	3/2R	P	P	Ρ	İİ	İ			ĺ		
05-6KF-2257B-2	FRCS-11049X	3/2R	P	P	₽	İİ	Ì			Ì		
i	FRCS-11053X	3/2R	P	P	Ρ	İ	Ì			l		
05-6KF-2257C-1	FRCS-11050X	3/2R	P	P	P	İİ	ĺ			İ		
i	FRCS-11054X	3/2R	P	Ρ	Р	İ	İ			l		1 1
05-6KF-2257C-2	FRCS-11051X	3/3	ĺ			li	İ			ĺ		
i	FRCS-11055X	3/3	ĺ				1			l		
05-6KF-2257D-1	FRCS-11044X	3/2R	P	P	P	3/1R	P	NA	P	EPD&C	4	x
İ	FRCS-11060X	3/2R	P	P	P	3/1R	P	NA	Ρ	EPD&C	4	x
05-6KF-2257D-2	FRCS-11045X	3/3	l							1		
İ	FRCS-11061X	3/3					1			1		
05-6KF-2257E-1	FRCS-11046X	3/3	l				1					
İ	FRCS-11062X	3/3	1							i		
05-6KF-2257E-2	FRCS-11047X	3/3	1							1		
1	FRCS-11063X	3/3								1		
05-6KF-2257F-1	FRCS-11064X	3/2R	P	P	P	3/1R	P	NA	Ρ	EPD&C	4	x
05-6KF-2257F-2	FRCS-11065X	3/2R	P	P	P	3/3	1			EPD&C	2	x
05-6KF-2257G-1	FRCS-11066X	3/3	l				İ			1		<b>i</b>
05-6KF-2257G-2	FRCS-11067X	3/3								1		1
05-6KF-2257H-1	FRCS-11068X	3/2R	Р	P	P	11	1			1		
05-6KF-2257H-2	FRCS-11069X	3/3				11				1		
05-6KF-2258 -1	FRCS-11070X	3/2R	P	P	P	2/2	1			EPD&C	4	X
05-6KF-2258 -2	FRCS-11071X	3/3	1			11				1		!!!
05-6KF-2258 -3	FRCS-11221X	3/2R	P	P	P	2/2				EPD&C		1 ×
05-6KF-2259 -1	FRCS-913	3/1R	P	F	P		-			EPD&C		X
1	FRCS-919	3/1R	:			2/1R	P	Ρ	Р	EPD&C	4	X
1	•	3/1R				11	ļ ļ			!		! !
1	FRCS-931	3/1R	:			: :	ļ					!!!
1	FRCS-941	3/1R	P	F	P	2/1R	P	F	Р	EPD&C	4	X
05-6KF-2259 -2	FRCS-914	3/3	ļ			Н	ļ ļ			ļ		!!!
	FRCS-920	3/3	1			ll.	!			!		!!!
	FRCS-926	3/3	ļ			ļļ.	ļ			ļ		
!	FRCS-932	3/3				Н	!			ļ.		! !
	FRCS-942	3/3		_	_	!!	!			!		1
05-6KF-2259A-1	FRCS-911	3/1R	:		P	11	ļ			!		
!	FRCS-917	3/1R	•		P	H	!			!		
!	FRCS-923	3/1R				[]	1			1		
	FRCS-929	3/1R	:			11				1		
	FRCS-939	3/1R	Į P	F	P	[ ]				]		
05-6KF-2259A-2	FRCS-912	3/3	I			 ========	1			I		1

IDENT1	FIERS	N/	ASA					10	)A R	ECOM	MENDATIONS	
NASA   FMEA NUMBER	IOA	CRIT	SC   A	REE B	NS C		CRIT HW/F	٨		C	OTHER (SEE LEGEND CODE)	ISSUE
05-6KF-2259A-2	FRCS-918	3/3	 I			• I	======	= = = 		.====	======================================	=====: 
	FRCS-924	3/3	İ			i		i			! [	1
i	FRCS-930	3/3	İ			i		i				i
j		3/3	İ			i		i			ĺ	i I
05-6KF-2260 -1	FRCS-909	3/1R	Р	F	P	i	2/1R	P	P	Р	EPD&C 4	i x
Ì	FRCS-915	3/1R	Р	F	P	i	2/1R	P	Р	P	EPD&C 4	i x
	FRCS-921	3/1R	Р	F	P	İ	İ	ĺ				İ
1	FRCS-927	3/1R	P	F	P	İ	İ				İ	i
ĺ	FRCS-943	3/1R	P	F	Р	İ	2/1R	Р	P	P	EPD&C 4	i x
05-6KF-2260 -2	FRCS-910	3/3	ĺ			İ	j	ĺ			İ	i
1	FRCS-916	3/3						ĺ			İ	i
	FRCS-922	3/3						ĺ			İ	İ
•	FRCS-928	3/3									ĺ	İ
1	FRCS-944	3/3									ĺ	Ì
05-6KF-2266 -1	FRCS-11219X	3/1R	P	F	Ρ						1	ĺ
1	FRCS-11220X	3/1R	P	F	P							ĺ
1	FRCS-933	3/1R	P	F	P	1					1	1
	FRCS-935	3/1R	P	F	P							1
05-6KF-2266 -2	FRCS-934	3/3	l									
	FRCS-936	3/3	1									
05-6KF-2267 -1	FRCS-324	3/3					3/2R	P	P	P	EPD&C 1	X
	FRCS-326	3/3					3/2R	P	P	P	EPD&C 1	[ x
05-6KF-2267 -2	FRCS-325	3/3				П					l	
	:	3/3										
05-6KF-2268 -1	i i	3/3					3/2R	P	P	P	EPD&C 1	X
		3/3				Ш	_ :	P	Р	P	EPD&C 1	X
		3/3						P	P	P	EPD&C 1	X
	:	3/3				11	3/2R	P	P	P	EPD&C 1	X
	FRCS-624						3/2R	P	P	P	EPD&C 1	X
	FRCS-626	3/3				!!	3/2R	P	P	Ρ	EPD&C 1	X
	FRCS-646	3/3				!!	3/2R	P	Р	P	EPD&C 1	X
0F /VF 33/0 3	FRCS-648	3/3		_	_	Ш	3/2R	P	Р	Р	EPD&C 1	X
U5-6KF-2268 -2	i i	3/1R		P	P	!!	إ					
		3/1R		2	2		l l					
	: :	3/1R		P	P		•				•	
		3/1R		P			•					
		3/1R		P	P	Ш	•					
	:	3/1R		P		11	!					
		i i		P								
05-6KF-2269 -1		: :	P	Р	۲		7 (2n	_			F0040 4	
-> ON: EEO7		:					3/2R   3/2R		Р	P o	EPD&C 1	X
05-6KF-2269 -2		: :				11	3/2K	Р	P	r	EFU&L   	X
05 OR! 2207 -2	FRCS-11057X	3/3     3/3					!			İ		
05-6KF-2270 -1		2/2					1				! 	
	FRCS-945	: :					! !			;		 
05-6KF-2270 -2	FRCS-946	3/3					1			l		
05-6KF-2271 -1	FRCS-937	3/1R	Р	F	Р		1				 	
				· 	· 	1 1					 	<u> </u>

IDENTI	FIERS	N/	ASA				10	A R	ECOM	MENDATIO	DNS	
NASA FMEA NUMBER	IOA     ASSESSMENT NUMBER	•	SCR   A	REEN	NS C	CRIT	A	REE	С		OTHER LEGEND CODE)	ISSUE 
2222222222222222222	=======================================	222222	::::::	***	====	======	=== '	===	====	=====:	************	====== 
05-6KF-2271 -2	FRCS-938	3/3	l • -	_	_		į			1		[ {
05-6KF-2280 -1	FRCS-11076X	3/1R	P	P	P		ļ				3	i I X
05-6KF-2280 -2	FRCS-11077X	3/1R	P	F	Р	3/3	!			EPD&C	2	) ^ 
05-6KF-2302 -1	FRCS-11195X	2/2		_	_		<u> </u>			]		 
05-6KF-2303 -1	FRCS-11197X	3/1R	P	P	Р						E	i I x
NONE	FRCS-1035	!	!			3/3				EPD&C		l ^
1	FRCS-11072X		!			3/1R	ן ף	N/	<b>1</b> P	EPD&C		i ^ I X
1	FRCS-11073X		!			3/3	! _			EPD&C		^   X
1	FRCS-11074X		!			3/1R	P	N/	A P	EPD&C		i ^
ļ	FRCS-11075X	!	!			3/3		_	_	EPD&C		!
	FRCS-11078X	ļ	!			3/2R	P		P	EPD&C		X
	FRCS-11079X	!	ļ			3/2R	P	P	P	EPD&C		X
l	FRCS-11196X	ļ	ļ			3/2R	P	F	Р	EPD&C	3	X
	FRCS-11198X	ļ	ļ			<u>                                     </u>	!			!		1
1	FRCS-11199X		ļ			!!	!			!		
	FRCS-11200X		ļ				!			!		
l	FRCS-11201X	1	!					_	_		_	
1	FRCS-11202X		1			2/1R	P	F	Р	EPD&C	_	X
1	FRCS-11203X					3/3			_	EPD&C		X
	FRCS-11204X	<b> </b>				3/2R	P	Р	Р	EPD&C	_	X
	FRCS-11205X	İ				2/1R	P	P	P	EPD&C		X
1	FRCS-11206X	1	1			2/1R	P	P	P	EPD&C		X
1	FRCS-11207X		ļ			3/2R	Į P	P	P	EPD&C		X
1	FRCS-11208X		ļ			3/2R	P	P	P	EPD&C		X
1	FRCS-11209X		ļ			3/2R	P	P	P	EPD&C		X
1	FRCS-11210X		ļ			3/2R	ļ P	Р	Р	EPD&C		X
	FRCS-11213X		1			2/1R	ļ P	F	P	EPD&C		X
1	FRCS-11214X	H	1			2/1R	ļ P	F	Р	EPD&C	•	X
1	FRCS-11215X		1			3/1R	P	F	Р	EPD&C	•	X
1	FRCS-11216X		1			3/1R	P	F	P	EPD&C	•	X
}	FRCS-11217X	11	1			2/1R	P	F	Р	EPD&C	4,5	) x
	FRCS-1132	11	1			11	ļ			!		!
1	FRCS-1133		l			11				ļ		
	FRCS-1134	11				11				ļ		!
1	FRCS-1135		1			H	1			ļ	_	ļ
1	FRCS-1144		1			3/2R	P	F	Ρ	EPD&C		X
	FRCS-1145	11	i			3/2R	P	F	P	EPD&C		l x
	FRCS-1154	11				3/2R	P	F	Ρ	EPD&C		X
	FRCS-1155		1			3/2R	P	F	P	EPD&C	: 5	X
1	FRCS-1227	11	1			11				1		ļ
	FRCS-1228	11	1			11				1		ļ
1	FRCS-1229					11				Ţ		ļ
1	FRCS-1230	11				П	1				_	!
1	FRCS-1301	H	1			3/2R	P	P	P	EPD&C	: 5	X

APPENDIX F

NASA FMEA TO IOA WORKSHEET CROSS REFERENCE / RECOMMENDATIONS - AFT EPD&C

IDENTII	FIERS	N.	ASA		ļ		ICA	RECOM	MENDATIONS	
NASA FMEA NUMBER	IOA     ASSESSMENT NUMBER	CRIT	: .	REENS	:	CRIT	SCRE		OTHER (SEE LEGEND CODE)	ISSUE
=======================================	***********	======		:::::	==		=====	=====		======
3-2A-203350-1	ARCS-1414	3/2R	P	P P	۱	1	1			ĺ
	ARCS-1415	3/2R	P	P P	۱					Ì
	ARCS-1416	3/2R	P	P P	۱	1	1		1	[
	ARCS-1417	3/2R	P	P P	۱	1	-			ĺ
	ARCS-1418	3/2R	ļΡ	P P	٠ ا	1			1	1
	ARCS-1419	3/2R	P	P P	۱					
	ARCS-1420	3/2R	P	P P	۱ ا		1		1	1
	ARCS-1421	3/2R	P	P P	١.					Ì
3-2A-203350-2	ARCS-1860	3/2R	P	P P	١	1	1			Ì
	ARCS-1861	3/2R	P	P P	١	1	ı			ĺ
	ARCS-1862	3/2R	P	P P	- 1	1				İ
	ARCS-1863	3/2R	P	P P	l		1			İ
	ARCS-1864	3/2R	P	P P	- 1	1	1			İ
	ARCS-1865	3/2R	P	P P			l			İ
	ARCS-1866	3/2R	P	P P	]		1			İ
	ARCS-1867	3/2R	P	P P	1	1	l		ĺ	İ
3-2A-203350-3	ARCS-2268	3/2R	P	P P	- 1		1			i
1	ARCS-2269	3/2R	P	P P	-	ĺ	İ		j	i
	ARCS-2270	3/2R	Р	P P	- 1	İ	1			İ
ļ	ARCS-2271	3/2R	P	P P	ĺ		Ì			i
I	ARCS-2272	3/2R	P	P P	İ	Ì	İ			i
I	ARCS-2273	3/2R	P	P P	İ	İ	İ		]	İ
	ARCS-2274	3/2R	P	P P	ĺ	Ì	ĺ			i
	ARCS-2275	3/2R	Р	P P	Ì	ĺ	İ			i
3-2A-203360-1	ARCS-1422	3/3			ĺ	Ì	İ			i
	ARCS-1423	3/3			Ì	Ì	ĺ			i
	ARCS-1424	3/3			İ	İ	İ			i
	ARCS-1425	3/3			ĺ	Ì	İ	1		i
3-2A-203365-1	ARCS-1868	3/2R	Р	P P	Í	İ	İ	i		Ì
Ì	ARCS-1869	3/2R	Р	P P	i	i	İ			ĺ
1	ARCS-1870	3/2R	P	P P	i	ì	ĺ			i
1	ARCS-1871	3/2R	Р	P P	i	i	ĺ			i
3-2A-203365-2	ARCS-2276	3/3	ĺ		i	i	ĺ			i
	ARCS-2277	3/3			i	Ì	İ	ï		i
	ARCS-2278	3/3			i	i	İ			! 
İ	ARCS-2279	3/3			i	i	İ			! 
3-2A-221314-1	ARCS-2280	3/1R	Р	P P	i	i		i		 
i	ARCS-2282	3/1R		P P	i		i	i		! 
i	ARCS-2283	3/1R		P P	•	i	ļ			
i	ARCS-2285	3/1R		P P	i	İ	I	ľ		! 
i		3/1R		P P	i	İ	İ	ļ		
İ		3/1R		P P	•	i	İ	ľ		
3-2A-221314-2	ARCS-2281	3/1R		P P	:	i i			!	
i	ARCS-2284	3/1R		P P	- 1		! !	1		

IDENTI	FIERS	N/	ASA		IOA RECOMM	ENDATIONS	
NASA FMEA NUMBER	IOA   ASSESSMENT NUMBER	CRIT	SCREENS	CRIT HW/F	SCREENS	OTHER (SEE LEGEND CODE)	ISSUE
:=====================================	=========    ARCS-2290	=======   3/1R	P P P	======	======   	25338252232522	
03-2A-221315-1	ARCS-2292	3/1R	PPP	i			
	ARCS-2294	3/1R	PPP	i	ĺ		1
	ARCS-2298	3/1R	PPP	1			
03-2A-221315-2	ARCS-2293	3/1R	PPP				1
	ARCS-2295	3/1R	P P P		<b>j</b>		1
	ARCS-2299	3/1R	PPP		<b> </b>		
03-2A-221316-1	ARCS-2316	3/2R	PPP				
	ARCS-2317	3/2R	P P P				
	ARCS-2318	3/2R	P				
03-2A-221316-2	ARCS-2319	3/3			1		
	ARCS-2320	3/3	1		[ [		1
	ARCS-2321	3/3	1		[		!
03-2A-221317-1	ARCS-2322	2/2					ļ
03-2A-221317-2	ARCS-2323	3/3	1		]		!
05-6KA-2001-1	ARCS-1362	3/1R	PPP				!
	ARCS-1363	3/1R	P P P		[		!
	ARCS-1364	3/1R	PPP				!
	ARCS-1365	3/1R	PPP		!		!
05-6KA-2003-1	ARCS-1524	3/1R	PPP				!
	ARCS-1525	3/1R	PPP				ł.
05-6KA-2004-1	ARCS-1526	3/1R	PPP		!		į
	ARCS-1527	3/1R	PPP	H			
05-6KA-2005-1	ARCS-1535	3/1R	PPP	ij	!		ļ
	ARCS-1536	3/1R	:	!!	!		!
	ARCS-1537	3/1R	:		!		!
	ARCS-1538	3/1R				1	!
05-6KA-2006-1		3/1R	PPP		!		!
		3/1R	:				!
05-6KA-2007-1	ARCS-2008	3/1R	PFP	11		]	]
	ARCS-2009	3/1R	P F P				l 1
	ARCS-2011	3/1R	PFP		!		1
	ARCS-2013	3/1R	:		İ	1	1
	ARCS-2017	3/1R	:		ļ	] 	1 1
	ARCS-2018	3/1R	:		i	<b> </b> 	I I
	ARCS-2020	3/1R	Ī		] 	 	! !
AF (W. 2000 4	ARCS-2022	3/1R	:		1	i I	! !
05-6KA-2008-1	ARCS-2004	3/1R	:	]	1	l ł	1
	ARCS-2005   ARCS-2010	3/1R    3/1R	:	1 1 1 1	I 	; 	i
	ARCS-2010   ARCS-2012	3/1R    3/1R	:	: : !	! 	İ	i
	ARCS-2012	3/1R    3/1R	:	; ; [ ]	i	1	
	ARCS-2016	3/1R	:	; ; ; ;	i		i
	ARCS-2019	3/1R	:	! !	İ	i I	i
	ARCS-2017	3/1R	:	11	i	i	i
05-6KA-2009-1	ARCS-2006	3/1R		ii	i		i
	ARCS-2007	3/1R	:	ii	i	i	i
	ARCS-2014	3/1R	PPP	ii	i		İ
:======================================	· ·	• •	1	• •	•	 ====================================	•

IDENTI	FIERS	N	ASA					IOA RECOM	MENDATI	ons	
NASA   FMEA NUMBER	IOA ASSESSMENT NUMBER	CRIT   HW/F	į a	REE	C	jj h	RIT W/F	SCREENS A B C		OTHER LEGEND CODE)	ISSUE
05-6KA-2010-1	ARCS-2314	2/2	 I			 			 		=====   
05-6KA-2011-1	ARCS-2310	2/2	i			ii			İ		
	ARCS-2311	2/2	İ			ii -	į		İ		i i
	ARCS-2312	2/2	1			H	İ		İ		i i
1	ARCS-2313	2/2	1			П	ĺ		Ì		i i
05-6KA-2014-1	ARCS-1531	3/1R	P	P	P	П	ĺ		ĺ		İ
1	ARCS-1532	3/1R	P	P	P	П					İ
	ARCS-1533	3/1R	P	P	P						
	ARCS-1534	3/1R	P	Ρ	Р	11			l		
05-6KA-2016-1	ARCS-1528	3/3	1			11	1				
1	ARCS-1529	3/3				11	1				
!	ARCS-1530	3/3	1			11					
05-6KA-2026-1	ARCS-12076X	3/1R	P	P	P						
05-6KA-2026-2	ARCS-12077X	2/1R	P	P	P	Ш					
	ARCS-12078X	2/1R	P	Р	P	11					
!	ARCS-12079X	2/1R	P	P	Ρ	Ш	ļ				
1 25 444 222 4	ARCS-12080X	2/1R	P	P	Р	!!	ļ				
05-6KA-2028-1	ARCS-12081X	3/1R	P	P	P	!!	Į				
   05 (KA 2020 2	ARCS-12085X	3/1R	P	P	P	!!					
05-6KA-2028-2	ARCS-12082X	3/1R	P	P	_	::	2/2		EPD&C		X
1	ARCS-12083X	3/1R	P	P	P	::	2/2		EPD&C		X
05-6KA-2029-1	ARCS-12084X	3/1R	P	P	P		2/2		EPD&C	6	X )
1	ARCS-12102X	3/1R	P	P	P	] ]	ŀ				
05-6KA-2029-2	ARCS-12106X	3/1R 3/1R	P   P	P P	P		) 2 (2			4	
1	ARCS-12104X	3/1R	P	P	P P	: :	2/2   2/2		EPD&C		X
1	ARCS-12105X	3/1R	P	Р	P	::	2/2		EPD&C		^     x
05-6KA-2030-1	ARCS-12172X	3/1R	P	P	P	1 1 ' 1 1	-/-		LIBRO		<b>^</b>
1	ARCS-12176X	3/1R	ј.   Р	P	Р	! ; ! !	1				! !
i	ARCS-12177X	3/1R	P	P	P	; ;	i				
İ	ARCS-12181X	3/1R	:	Р	P	ii	i				! !
j	ARCS-12182X	3/1R	•	Р	Р	ii	i				! ! 
İ	ARCS-12186X	•	•	Р	P	ii	i				
İ	ARCS-12187X			P		İİ	i				
	ARCS-12191X		:	Ρ		İİ	i				<u> </u>
05-6KA-2030-2	ARCS-12173X	3/1R	P	P		İÌ	i			i	i
1	ARCS-12174X	3/1R		P		ĺĺ	ĺ				i
1	ARCS-12175X	3/1R	P	Ρ		ĺĺ	i			İ	i
1	ARCS-12178X	3/1R	P	P		11	ĺ				i
1	ARCS-12179X	3/1R	P	P	P	Н	- 1	İ			i
	ARCS-12180X	3/1R	P	P			-				i
1	ARCS-12183X	3/1R	P	P	P	П	- 1			İ	į
!	ARCS-12184X	3/1R	P	P						ĺ	į
İ	ARCS-12185X	3/1R	P	P	Ρ		1			l	İ
	ARCS-12188X	3/1R	•	P	P		1			1	1
	ARCS-12189X	3/1R	•	P	_		ļ			ļ	1
1 05 444 0075 4	ARCS-12190X	3/1R	•	P		11	ļ			1	1
05-6KA-2032-1	ARCS-12003X	3/1R	ĮΡ	P	P		1			1	1

IDE	ITIFIERS	N.	ASA	 		IOA RECOMI	MENDATIONS	
NASA FMEA NUMBER	IOA   ASSESSMENT NUMBER		SCREENS   A B C	CRI		SCREENS	OTHER (SEE LEGEND CODE)	ISSUE
05-6KA-2032-1	ARCS-12007X	    3/1R	P P P	 		 	1	
05-6KA-2032-2	ARCS-12004X	3/1R	PFP	3/	1R	PPP	EPD&C 2	X
	ARCS-12005X	3/1R	PFP	3/	1R	PPP	EPD&C 2	X
	ARCS-12006X	3/1R	PFP	3/	1R	PPP	EPD&C 2	X
05-6KA-2035-1	ARCS-12256X	3/1R	PFP	2/	2	1	EPD&C 6	X
	ARCS-12259X	3/1R	PFP	11		1		
	ARCS-12260X	3/1R	P F P	2/	2	1	EPD&C 6	Х
	ARCS-12266X	3/1R	PPP	11			1	
	ARCS-12269X	3/1R	PFP	11		1		
	ARCS-12270X	3/1R	PFP	11				l
	ARCS-12276X	3/1R	PFP	2/	2	1	EPD&C 6	X
	ARCS-12279X	3/1R	PFP	11		}	<u> </u>	
	ARCS-12280X	3/1R	PFP	2/	2	]	EPD&C 6	X
	ARCS-12286X	3/1R	P F P			1		<u> </u>
	ARCS-12290X	3/1R	PFP	H		1		<u> </u>
05-6KA-2035-2	ARCS-12257X	3/3		11		1	1	
	ARCS-12258X	3/3	1			1		ļ
	ARCS-12267X	3/3	l	11		1	İ	ļ
	ARCS-12268X	3/3	1	11		1	!	<u> </u>
	ARCS-12277X	3/3	1	11		1		
	ARCS-12278X	3/3	1	11		1	!	<u> </u>
	ARCS-12287X	3/3	1	11		1	!	!
	ARCS-12288X	3/3	ļ			i		<u> </u>
	ARCS-12289X	3/3	!	!!		ļ		<u> </u>
05-6KA-2036-1	ARCS-12261X	3/1R	PPP	!!		<u> </u>		1
	ARCS-12264X	]  3/1R	PPP	П		ļ	1	
	ARCS-12265X	3/1R	PPP	II .		ļ	1	1
	ARCS-12271X	3/1R	PPP	<u>II</u>			ļ	1
	ARCS-12274X	3/1R	PPP	!!		ļ	ļ	1
	ARCS-12275X	3/1R	PPP			ļ		1
	ARCS-12281X	3/1R	PPP	!!		!	1	
	ARCS-12284X	3/1R	•	!!		!	!	<u> </u>
	ARCS-12285X	3/1R	•	!!		!	!	 
	ARCS-12291X	3/1R		!!		1	1	! !
	ARCS-12294X	3/1R	:	11		1	] ]	1
	ARCS-12295X	3/1R		!! -		!	1 50000 3	i I x
05-6KA-2036-2	ARCS-12262X	3/1R	:	::	/3	!	EPD&C 2   EPD&C 2	1 ^
	ARCS-12263X	3/1R		11	/3	1	!	l ^
	ARCS-12272X	3/1R	:	!!	/3 /3	J	EPD&C 2   EPD&C 2	1 ^
	ARCS-12273X	3/1R		::	/3 /3	1	EPD&C 2	)
	ARCS-12282X	3/1R	:	• •	/3 /2	1	EPD&C 2	1 ^ 1 X
	ARCS-12283X	3/1R		::	/3 /3		EPD&C 2	l x
	ARCS-12292X	3/1R		::	/3 /3	1	EPD&C 2	l ^
05 (VA 3077 4	ARCS-12293X	3/1R	PPP	11 3.	, ,	I I	I CLOSE E	1 ^
05-6KA-2037-1	ARCS-12296X	2/2		11		1	1	i i
	ARCS-12298X	2/2	1	11		1	1	1
	ARCS-12300X	2/2	1	11		 	1	i
	ARCS-12301X	2/2	I	1 I		1	1	i

IDE	ENTIFIERS	N	ASA		IOA RECOM	MENDATIONS	
NASA FMEA NUMBER	IOA ASSESSMENT NUMBER	CRIT	SCREENS	CRIT    HW/F	SCREENS	OTHER (SEE LEGEND CODE)	ISSUE
   05-6KA-2037-1	ARCS-12303X	======    2/2	======================================		: ======== 		: ====== 
		2/2	i	; ; 	i	i	1
	i	2/2	i	ii	i	! 	;
		2/2	ì	ii	ì	İ	;
		2/2	1	ii	i	! 	
		2/2	i	ii	i		i
		2/2	i	ii	İ	! 	i
		2/2	i ·	ii	İ	•	i
05-6KA-2037-2		3/3	i	ii	i	1	1
		3/3	i		i	<u> </u>	i
		3/3	i	ii	i	İ	i
		3/3	i	ii	i	! !	İ
		3/3	i	i	i	<u> </u>	i
	i	3/3	İ	ii	i	i	i
		3/3	i		i	<u> </u>	1
	ARCS-12314X	3/3	į	ii	i	i	i
05-6KA-2039-1		3/1R	PPP	İ	İ	İ	i
	ARCS-12128X	3/1R	PPP	ii	i	i İ	i
		3/1R	P P P	ii	i	•	İ
		3/1R	PPP	ii	İ	İ	ì
	ARCS-12149X	3/1R	PPP	i	i		i
	ARCS-12150X	3/1R	PPP	i	i	İ	i
05-6KA-2039-2	ARCS-12126X	3/1R	PFP	2/2	ĺ	PD&C 3	i x
	ARCS-12127X	3/1R	PFP	2/2	i	EPD&C 3	İx
	ARCS-12147X	3/1R	PFP	2/2	i	EPD&C 3	i x
	ARCS-12148X	3/1R	PFP	2/2	İ	EPD&C 3	j x
05-6KA-2040-1	ARCS-12167X	3/3	<b>i</b>	İ	İ		i
	ARCS-12171X	3/3	İ	Ì	İ		i
05-6KA-2040-2	ARCS-12168X	3/3	İ	ĺ	Ì		i
	ARCS-12169X	3/3	1		İ		İ
	ARCS-12170X	3/3	l	İ	1		i
05-6KA-2042-1	ARCS-12316X	2/2	İ	ĺ	ĺ		i
	ARCS-12318X	2/2	l i		ĺ		İ
	ARCS-12320X	2/2			1		İ
05-6KA-2042-2	ARCS-12317X	3/3			1		İ
	ARCS-12319X	3/3		1			İ
05-6KA-2076-1	ARCS-1366	3/3	[ [	1			İ
	ARCS-1367	3/3		1	1		ĺ
	ARCS-1368	3/3		1	1 1		İ
	ARCS-1369	3/3	1 1	1	1		
	ARCS-1370	3/3	[ [	1	1		1
	· '	3/3		1	1		1
	ARCS-1382	3/3		1	1 1		1 :
	ARCS-1383	3/3	]	1			1
	ARCS-1384	3/3		1	1		1
	ARCS-1385	3/3		1	1		1
	ARCS-1386	3/3		1	1		[
	ARCS-1387	3/3					

IDE	NTIFIERS	N/	ASA		!	10A RECOMMENDATIONS							
NASA FMEA NUMBER	IOA     ASSESSMENT NUMBER	CRIT	SCF	REEN	IS C	CRIT	A	_	С		OTHER Legend Code)	ISSUE	
	=== ===================================	=======	: = = :: :	====	===	-=====	1		==== P	EPD&C	:22525233552555 1	=====:   X	
05-6KA-2077-1	ARCS-1372	3/3	] t			3/2R	F	•	Γ.	Erbac	•	i ~	
	ARCS-1373	3/3	 			 	l IP	D	Р	EPD&C	1	ίx	
	ARCS-1374	3/3	 			3/2K	'	r	•	[, 545	•	1	
	ARCS-1375	3/3	 			    3/2R	I   P	D	P	EPD&C	1	i x	
	ARCS-1378	3/3	 			3/6%	, ,	•	•	[	•	1	
	ARCS-1379	3/3	] 				l P	P	Р	EPD&C	1	i x	
	ARCS-1380	3/3	 				]	•	•	2.546 	•		
		3/3	1			    3/2R	l I P	P	Р	EPD&C	1	iх	
	ARCS-1388	3/3	1			3/2×	'	•	r	1	•	1	
	ARCS-1389	3/3	1 1				l l P	Р	Р	EPD&C	1	Ιx	
	ARCS-1390	3/3	 				ļ .	•	•	<u>-</u> , -, -, -	•	i	
	ARCS-1391	3/3    3/3	!			    3/2R	!   P	Р	Р	I EPD&C	1	i x	
	ARCS-1394	3/3   3/3	1			3/EK	¦ '		•	1	•	i	
	ARCS-1395	3/3	1			    3/2R	l I P	Р	P	EPD&C	1	i x	
	ARCS-1396		1				i .	•	•	1	•	i	
o= (w. 0070 4	!		1			    3/2R	I I P	P	Р	)   EPD&C	1	i x	
05-6KA-2078-1	•		1			3/2R	l P	Р	Р	EPD&C		i x	
		3/3	1			3/2R	l P	P	Р	EPD&C		i x	
		3/3				3/2R	l P	Р	Р	i EPD&C		i x	
		3/3	1			3/2R	l P	P	Р	EPD&C	_	i x	
05-6KA-2081-1		3/3	1			3/2R	i P	P	P	EPD&C		i x	
	ARCS-1591	3/3	1			3/2R	l P	P	P	EPD&C		İx	
	•	3/3	!			3/25	"	•	•	, c. 500 1	•	i	
	ARCS-1604	3/3	1			    3/2R	l I p	Р	P	i EPD&C	1	i x	
4	<u> </u>	3/3	1			3/2R	1 6		P	EPD&C		i x	
05-6KA-2082-1	•	3/3	!			11 3/5	1	•	•	1	•	i	
	· · · · · ·	3/3	!			    3/2R	!   P	D	Р	EPD&C	1	i x	
	•	3/3	1			11 3/5%	1	•	•	1	•	1	
	•	3/3	1	r	Р	    3/2R	i I P	Р	P	   EPD&C	2	iх	
05-6KA-2083-1	ARCS - 1593	2/1R	P	r	P	3/2R	!	Р	, P	EPD&C		i x	
	ARCS-1595	2/1R		r		3/2R	•		P	EPD&C		l x	
	•	2/1R	P	F	Р	3/2%	1	•	•	1	-		
05-6KA-2083-2	Ţ.	3/3	1			11	1			1		i	
		3/3	!			11	1			1		i	
4	<u>.</u>	3/3		E	D	    3/2R	I I P	Р	Р	EPD&C	. 2	ίx	
05-6KA-2084-1	ARCS-1609	2/1R	P	-	P P	3/2R	•	P	_	EPD&C		i x	
	ARCS-1621	2/1R	l P	F	P	3/2R	:		P	EPD&C		i x	
	ARCS-1625	2/1R	l P	F	P	3/2R			P	EPD&C		X	
	ARCS-1637	2/1R	"	•	•	11 3/ 5/	i .	·	•	1	_	ĺ	
05-6KA-2084-2	ARCS-1610	3/3	i i			11	1					i	
		3/3	1			11	1			1		i	
	•	3/3    3/3	1			11	1			ì		i	
0E 4VA 300E 4		::	1			    3/2R	l I P	Р	Р	EPD&C	: 1	ĺχ	
05-6KA-2085-1	ARCS-1613	::	1			11 3/2	'	•	•	1		i "	
	ARCS-1614	3/3    3/3	l l			    3/2R	0	Р	Р	EPD&C	: 1	¦ x	
	ARCS-1615	1 1	i I			-	1	•	•	540	<del>.</del> -	i "	
	ARCS-1616	3/3	1			    3/2R	1			1	: 1	¦ x	

IDEN	TIFIERS	N	IASA		IOA RECOM	MENDATIONS	
NASA   FMEA NUMBER	IOA ASSESSMENT NUMBER	CRIT    HW/F	SCREENS		SCREENS	OTHER (SEE LEGEND CODE)	ISSUE
=====================================	== ===================================	======    3/3		======= 	=======================================	=======================================	=====:
1		3/3	1	    3/20	1   P P P	EPD&C 1	
1	ARCS-1630	3/3   3/3	1	3/2K 	P	I ELDER I	X
!   05-6KA-2086-1	ARCS-1607	3/3	1	    3/20	   P P P	EPD&C 1	1 .
	ARCS-1611	3/3	1	3/2R	:	EPD&C 1	X   X
	ARCS-1619	1 3/3	i	3/2R	:	EPD&C 1	l x
	ARCS-1623	1 3/3	! !	: :	PPP	EPD&C 1	l ^
	ARCS-1624	1 3/3	•		1	Lroac	1 ^
	ARCS-1627	3/3		    3/2R	I I P P P	EPD&C 1	l x
	ARCS-1631	3/3	i	3/2R		EPD&C 1	1 ^
	ARCS-1633	3/3	i	3/2R	:	EPD&C 1	i x
	ARCS-1635	3/3		3/2R	1	EPD&C 1	i x
05-6KA-2087-1	ARCS-1675	3/3	İ	3/2R	1   P P P	EPD&C 1	l x
	ARCS-1676	3/3			, , , , 	1	^ 
	ARCS-1677	3/3		3/2R	!   Р Р Р	EPD&C 1	,   x
	ARCS-1678	3/3	1	-/		1	1 ^
	ARCS-1689	3/3	i		   P P P	EPD&C 1	l x
	ARCS-1690	3/3	i		i	1	1 ^
	ARCS-1691	3/3	i	3/2R	   P P P	I EPD&C 1	l x
	ARCS-1692	3/3	İ	-,	1	1	1 ^
	ARCS-1703	3/3	i	3/2R	IPPP	EPD&C 1	i x
	ARCS-1704	3/3	i		i		^
	ARCS-1705	3/3	i i	3/2R	P P P	   EPD&C 1	l x
	ARCS-1706	3/3	i i	1			, ^ 
	ARCS-1717	3/3	i i	3/2R	P P P	EPD&C 1	l x
	ARCS-1718	3/3	i i	İ	İ	1	1 "
	ARCS-1719	3/3	i i	3/2R	PPP	I EPD&C 1	i x
	ARCS-1720	3/3	j j	i	İ		"
05-6KA-2088-1	ARCS-1679	3/3	i i	3/2R	PPP	EPD&C 1	i x
	ARCS-1680	3/3	i i	i	İ	İ	İ
	ARCS-1681	3/3	i i	3/2R	PPP	EPD&C 1	i x
	ARCS-1682	3/3	İ	İ	İ	İ	i
	ARCS-1685	3/3	İ	3/2R	PPP	EPD&C 1	x
	ARCS-1686	3/3	l i	1		İ	İ
	ARCS-1687	3/3		3/2R	PPP	EPD&C 1	j x
	ARCS-1688	3/3		1			İ
	ARCS-1693	3/3	1	3/2R	PPP	EPD&C 1	χ
	ARCS-1694	3/3		1			Ī
	ARCS-1695	3/3		3/2R	PPP	EPD&C 1	X
	ARCS-1696	3/3					
	ARCS-1699	3/3	i I	3/2R	PPP	EPD&C 1	j x
	ARCS-1700	3/3		1			
	ARCS-1701	3/3		3/2R	PPP	EPD&C 1	х
	ARCS-1702	3/3		1			ļ
	ARCS-1707	3/3	<u> </u>	3/2R	PPP	EPD&C 1	×
	ARCS-1708	3/3	! !				ļ
	ARCS-1709	3/3		3/2R	PPP	EPD&C 1	x
	ARCS-1710	3/3		1			l i

IDE	NTIFIERS	l N/	ASA				10	A R	ECOM	MENDATIO	ons	
NASA FMEA NUMBER	IOA     Assessment number	CRIT	SC   A	REE B	NS (	CRIT	SC	REE B	NS C	(SEE	OTHER Legend Code)	ISSUE
05-6KA-2088-1	ARCS-1713	3/3	 	===	==== 	3/2R	===   P	Р	P	EPD&C	1	X
	ARCS-1714	3/3	İ		i	i	Ì			İ		1
	ARCS-1715	3/3	İ		j	3/2R	P	P	P	EPD&C	1	X
	ARCS-1716	3/3	Ì		Í	İ	ĺ			İ		1
	ARCS-1721	3/3	İ		ĺ	3/2R	P	P	P	EPD&C	1	X
	ARCS-1722	3/3	Ì				ĺ			1		
	ARCS-1723	3/3				3/2R	P	P	P	EPD&C	1	X
	ARCS-1724	3/3				1	1					1
	ARCS-1727	3/3				3/2R	P	P	P	EPD&C	1	X
	ARCS-1728	3/3				1	1			Į.		
	ARCS-1729	3/3				3/2R	P	P	P	EPD&C	1	X
	ARCS-1730	3/3										
05-6KA-2089-1	ARCS-1683	2/1R	P	F	P	3/2R	P	P	P	EPD&C	2	X
	ARCS-1697	2/1R	P	F	P	3/2R	P	P	Ρ	EPD&C	2	X
	ARCS-1711	2/1R	P	F	P	3/2R	P	P	P	EPD&C	2	X
	ARCS-1725	2/1R	P	F	P	3/2R	P	P	P	EPD&C	2	x
05-6KA-2089-2	ARCS-1684	3/3	1				1			1		
	ARCS-1698	3/3	1									
	ARCS-1712	3/3								1		1
	ARCS-1726	3/3	1							1		1
05-6KA-2090-1	ARCS-12008X	3/1R	P	F	P	3/2R	P	Ρ	P	EPD&C	2	x
05-6KA-2090-2	ARCS-12009X	3/3	1									1
05-6KA-2091-1	ARCS-12012X	3/3				3/2R	P	P	Ρ			1
	ARCS-12013X	3/3				3/2R	P	Ρ	Р	1		1
	ARCS-12014X	3/3				3/2R	P	P	P	1		1
	ARCS-12015X	3/3				3/2R	P	P	P			
05-6KA-2092-1	ARCS-12010X	3/3	1			11	1					ļ
	ARCS-12011X	3/3	1				1					
05-6KA-2093-1	ARCS-2029	3/3				Ц						ļ
	ARCS-2030	3/3				1	ļ					
	ARCS-2071	3/3					ļ					l
	•	3/3					!			ļ		ļ
	ARCS-2089	3/3	ļ				!			ļ		ļ
	ARCS-2090	3/3	!				!			!		1
	ARCS-2125	3/3	!				ļ			1		!
	ARCS-2126	3/3		_	_		ļ			!		!
05-6KA-2094-1	ARCS-2046	3/1R	P	F	P -		!			!		1
	ARCS-2056	3/1R	P	F	P		į			!		1
	ARCS-2062	3/1R	P	F	P	!!	ļ			!		1
	ARCS-2074	3/1R	P	F	P					ļ		1
	•	3/1R	P	F						1		1
	ARCS-2116	3/1R	P	F	P	]	1			1		1
AF (V) 3001 A		3/1R	P	F	P					I I		1
05-6KA-2094-2	•	3/3	1				1			1		
	•	3/3	1				1			1		1
	ARCS-2061	3/3	1			 				1		1
	ARCS-2073	3/3	1			 	1			! 		1
	ARCS-2105	3/3	i			1	1			1	2302222222222	l

IDE	NTIFIERS	N N	ASA	!!	IOA	RECOM	MENDATIONS	
NASA FMEA NUMBER	IOA     ASSESSMENT NUMBER		SCREENS	    CRIT    HW/F	:	EENS B C	OTHER (SEE LEGEND CODE)	ISSUE
05-6KA-2094-1	ARCS-2115	======    3/3	======================================	===== 	==   ====			====== 
03 OKA 2074 1		3/3	! 	! ! ! !	1		1	! 1
05-6KA-2095-1		3/3	1		i		1	1 1
		3/3	i		i		1	! 
		3/3	i	ii	i		1	1 
		3/3	i	ii	i			i
	ARCS-2087		i	ii	i		i	i
		3/3	i	ii	i		•	i
05-6KA-2096-1		3/3	į	ii	i		i	i
		3/3	i	ii	i		İ	İ
		3/3	Ì	İÌ	Ì		İ	į
	ARCS-2054	3/3	1	11	ĺ		İ	ĺ
	ARCS-2057	3/3	1		1		1	l
	ARCS-2058	3/3	1		1		1	l
	ARCS-2059	3/3	I		1		İ	
	ARCS-2060	3/3	1	] ]	1		İ	Ì
	ARCS-2067	3/3	1		1			1
	ARCS-2068	3/3	1	П	1		1	l
	ARCS-2069	3/3	1		1		1	
	ARCS-2070	3/3	1		1		1	1
	ARCS-2079	3/3	1	11	1			1
	ARCS-2080	3/3	1	11	1		1	1
	ARCS-2081	3/3	1	11	1			1
		3/3	I		-			
		3/3	ļ	<b>!</b>	ļ			l
		3/3	ļ	[]	ļ			1
		3/3	ļ		ļ		ļ	
		3/3	!	Ц	!		ļ	
		3/3	!	H	ļ			
		3/3	ļ.	H	!			
	•	3/3		!!	ļ			
	ARCS-2114	3/3	!	!!	ļ			ļ
	ARCS-2121	3/3		[ ]	!			
	ARCS-2122	3/3	ļ	!!	ļ.			
	ARCS-2123	3/3	!		ļ		į	
	ARCS-2124	3/3	1	11	ŀ		1	ļ
	ARCS-2137	3/3	1	!!	ļ		<b> </b>	
	ARCS-2138   ARCS-2139	3/3	1	11	- !			
	<u>'</u>	3/3	1		ļ.			
05-6KA-2097-1	ARCS-2140   ARCS-2047	3/3	] 		i I		1	 
UJ-URM-6U7/"	ARCS-2047	3/3	! !		l I		1	 
	ARCS-2049	3/3   3/3	! 1		i i		1	 
	ARCS-2049   ARCS-2050	3/3   3/3	] 	 	F I		1	 
			; ;	<b> </b>   <b> </b>	ļ 1		1	 
			1	1 <b>1</b>	1		} 1	 
	ARCS-2085	3/3   3/3	 	l <b>i</b> l <b>i</b>	[ 		1 1	 
	ARCS-2086	3/3	[ {		i I		[   	!
	AKC3-2000	1 3/3	I .	I I	1		I	

	NTIFIERS		ASA		IOA RECOMM		
NASA FMEA NUMBER	IOA     ASSESSMENT NUMBER	CRIT	SCREENS	CRIT	SCREENS	OTHER (SEE LEGEND CODE)	ISSUE
======================================	=== ==================================	======:    3/3	********		= = = = = = = =	=======================================	===== 
JJ-0KA-2U97-1	ARCS-2107   ARCS-2108	3/3	l f				i
	ARCS-2109	3/3    3/3	! !				i
		3/3	! !		1		i
	•	3/3	;		1	! 	i
	•	3/3	! 				i
	•	3/3	1		i		i
	•	3/3	1	1 I	i		i
05-6KA-2098-1	•	3/3	i		i		i
03 OKA 2070 1		3/3	i	; ; 	i		i
	ARCS-2033	3/3	•	i i	İ		i
	ARCS-2034	3/3	1	ii	i		i
	ARCS-2035	3/3	i	11	i		i
		3/3	i	ii	i	İ	İ
		3/3	i	İ	i		ĺ
		3/3	İ	ii	i		İ
		3/3	İ	İ	Ì		1
		3/3	i	ii	i		Ì
		3/3	į	İİ	Ì	İ	1
		3/3	İ	Ï	Ì		1
		3/3	İ	ii .	1		1
	·	3/3	ĺ	11	1		1
		3/3	ĺ	11	1		1
	ARCS-2078	3/3	1	11	1	1	l
	ARCS-2091	3/3	1	11	1		1
	ARCS-2092	3/3	1	11	1		1
	ARCS-2093	3/3	!		1	1	1
	ARCS-2094	3/3	1		1		1
	ARCS-2097	3/3	1		1		1
	ARCS-2098	3/3	1	11			1
	ARCS-2099	3/3	1	11			
	ARCS-2100	3/3			1		1
	ARCS-2117	3/3	1	11		ļ	ļ
	ARCS-2118	3/3	1	11		!	ļ
	ARCS-2119	3/3	[	11	1	ļ	Į
	ARCS-2120	3/3		]]	ļ		ļ
	ARCS-2133	3/3	!	!!	ļ	!	!
	ARCS-2134	3/3	ļ	11		!	
	ARCS-2135	3/3	!	!!	ļ	1	
	ARCS-2136	3/3	!	11	ļ	!	1
05-6KA-2099-1	ARCS-2324	3/3	!	!!	ļ	1	!
	ARCS-2325	3/3		!!	İ	1	1
	•	3/3	!	11	ļ		1
	ARCS-2327	3/3	1	П	ļ		
		3/3			1	1	1
		3/3    3/3		H	1	]	1
	ARCS-2330	3/3		11		Ī	i i

IDE	NTIFIERS	l N	ASA				10	A R	ECOM	MENDATI	ONS	
NASA FREA NUMBER	IOA   ASSESSMENT NUMBER	CRIT	:	EENS B C		CRIT	SC	REE		   (SEE	OTHER LEGEND CODE)	ISSUE
	:	======		====	==	======	===	===	====			======
05-6KA-2099-1	ARCS-2332	3/3			į	j i	İ			į		İ
İ	ARCS-2333	3/3	Ì		İ	İ	ĺ					İ
05-6KA-2102-1	ARCS-1641	3/3	]		ĺ	3/2R	P	P	P	EPD&C	1	j x
1	ARCS-1642	3/3	1		İ	1	ĺ					İ
	ARCS-1647	3/3	1		İ	3/2R	P	P	Р	EPD&C	1	X
	ARCS-1648	3/3	1			1				1		Ì
	ARCS-1651	3/3	1		- 1	3/2R	P	P	P	EPD&C	1	X
	ARCS-1652	3/3			- 1	1				1		
	ARCS-1655	3/3				3/2R	P	P	P			
	ARCS-1656	3/3	1		1	1				1		1
1	ARCS-1659	3/3			-	3/2R	P	P	P	EPD&C	1	x
1	ARCS-1660	3/3	1		-	1				1		1
1	ARCS-1665	3/3				3/2R	P	P	P	EPD&C	1	1 x
1	ARCS-1666	3/3			-	1						1
1	ARCS-1669	3/3	1			3/2R	P	P	P	EPD&C	1	x
1	ARCS-1670	3/3				1				l		1
1	ARCS-1673	3/3	1			3/2R	P	P	P	EPD&C	1	X
1	ARCS-1674	3/3				1						
05-6KA-2103-1	ARCS-1643	2/1R	P	F P	'	3/2R	P	P	P	EPD&C	2	X
1	ARCS-1645	2/1R	P	F P	'	3/2R	P	P	P	EPD&C	2	x
	ARCS-1649	2/1R	P	F P	'	3/2R	₽	P	P	EPD&C	2	l x
	ARCS-1661	2/1R	P	F P	'	3/2R	P	P	P	EPD&C	2	X
	ARCS-1663	2/1R	P	F P	'	3/2R	P	P	P	EPD&C	2	X
1	ARCS-1667	2/1R	P	F P	'	3/2R	P	Р	P	EPD&C	2	X
	ARCS-1639	3/3	1		1					l		1 .
1	ARCS-1640	3/3				]						
	ARCS-1653	3/3	!		ا							1
		3/3	ļ			] [						
!	: :	3/3	!		ļ							
!	:	3/3	ļ		ļ							
!	ARCS-1671	3/3	!		ļ							
	ARCS-1672	3/3	!		ļ							
05-6KA-2109-1	ARCS-2149	3/3	!		ا							ļ
	ARCS-2150	3/3	!		ļ	! !						
05-6KA-2110-1		3/3	ļ		ļ							
!	: :	3/3	ļ		ļ	!!!						
		3/3	[		ļ	!!!						:
	: :	3/3	!		ļ	!!!						į.
	:	3/3			ļ.	!!!						1
1		3/3			ļ	!!!						!
	_ :	3/3			ļ	!!!						
   05 484 3444 4		3/3			ļ	!!!			İ			
05-6KA-2111-1	ARCS-2044	3/1R	P	F P	!	!!						
1 05 444 3434 4	ARCS-2096	3/1R	:	F P	•							1
05-6KA-2126-1	ARCS-1545	3/1R		P P	:	: :				EPD&C		X
   05 (MA 3434 3	ARCS-1547	3/1R	:	P P	:	2/2				EPD&C		X
05-6KA-2126-2	ARCS-1546	3/1R		F P	- :	3/3				EPD&C		X
I	ARCS-1548	3/1R	Р	F P		3/3				EPD&C	2	1 x

IDEN	ITIFIERS	N/	NSA		IOA RECOM	MENDATIONS	
NASA FMEA NUMBER	IOA ASSESSMENT NUMBER	HW/F	SCREENS     A B C	CRIT	SCREENS	OTHER (SEE LEGEND CODE)	ISSUE
======================================	ARCS-1551	======    2/2	:====== 	2/1R	P P P	EPD&C 3	X
	ARCS-1555	2/2	į i	2/1R	PPP	EPD&C 3	X
05-6KA-2127-2	ARCS-1552	2/1R	PFP	3/1R	PFP	EPD&C 3	X
	ARCS-1556	    2/1R	PFP	3/1R	PFP	EPD&C 3	X
05-6KA-2128-1	ARCS-1575	]  3/1R	PPP	İ	1		1
	ARCS-1579	3/1R	PPP	1	1		1
	ARCS-1583	3/1R	PPP	Ì	1		1
	ARCS-1585	3/1R	P P P		1		l
05-6KA-2128-2	ARCS-1576	2/1R	P F P	3/1R	P P P	EPD&C 2,3	X
	ARCS-1580	2/1R	PFP	3/1R	PPP	EPD&C 2,3	X
	ARCS-1584	2/1R	P	3/1R	PPP	EPD&C 2,3	X
	ARCS-1586	2/1R	P F P	3/1R	PPP	EPD&C 2,3	X
05-6KA-2128A-1	ARCS-1573	3/1R	PPP	1			ļ
	ARCS-1577	3/1R	PPP	1	[		!
	ARCS-1581	3/1R	PPP		ļ	!	!
	ARCS-1587	3/1R	P		Į.		
05-6KA-2128A-2	ARCS-1574	2/1R	P F P	3/1R	PNAP	EPD&C 2	X
	ARCS-1578	2/1R	PFP	3/1R	PNAP	EPD&C 2	X
	ARCS-1582	2/1R	PFP	3/1R	PNAP	EPD&C 2	X
	ARCS-1588	2/1R	P F P	3/1R	PNAP	EPD&C 2	X
05-6KA-2130-1	ARCS-2023	3/1R	PPP	!!		!	!
	ARCS-2025	3/1R	PPP			!	!
	ARCS-2027	3/1R	1			1	
05-6KA-2130-2	ARCS-2024	3/1R	PPP	3/3		EPD&C 2	X
	ARCS-2026	3/1R	P P P	3/3		EPD&C 2	X
	ARCS-2028	3/1R	PPP	3/3	!	EPD&C 2	1 ^
05-6KA-2132-1	ARCS-1561	3/1R	:		1	 	1
	ARCS-1563	3/1R	:		!	}	1
	ARCS-1569	3/1R	P P P		l I	] ]	1
	ARCS-1571	3/1R	:		1	I EPD&C 2	i x
05-6KA-2132-2	ARCS-1562	3/1R	PFP	3/3    3/3	1	EPD&C 2	l x
	ARCS-1564	3/1R	1		1	EPD&C 2	l x
	ARCS-1570	3/1R    3/1R	P F P   P   P   P   P   P   P   P   P	3/3    3/3	1	EPD&C 2	i x
OF 444 2477 1	ARCS-1572			3/3    3/2R	   P P P	EPD&C 2	i x
05-6KA-2133-1	ARCS-1557   ARCS-1559	3/1R    3/1R		3/2R	:	EPD&C 2	i x
	ARCS-1565	3/1R	PPP	3/2R	:	EPD&C 2	l x
	ARCS-1567	3/1R	PPP	3/2R	:	EPD&C 2	X
05-6KA-2133-2	ARCS-1558	2/1R	!	3/1R		EPD&C 2	i x
US ORM CISSE	ARCS-1560	2/1R	•	3/1R	:	EPD&C 2	i x
	ARCS-1566	2/1R	P F P	3/1R	P NA P	EPD&C 2	į x
	ARCS-1568	2/1R	1	3/1R	P NA P	EPD&C 2	į x
05-6KA-2136-1	ARCS-1541	3/1R	:		i	i	i
75 UKA 2130 I	ARCS-1543	::	•		i	i	i
05-6KA-2136-2	ARCS-1542	2/1R		2/2	i	EPD&C 3	j x
	ARCS-1544	2/1R	PFP	2/2	i	EPD&C 3	j x
05-6KA-2137-1	ARCS-1549	3/1R	!	ii	i		İ
,	ARCS-1553	3/1R	PPP	ii	i	i	i

IDENTII	FIERS	N/	ASA			11		IOA	R	ECOM	MENDATI	ONS	
NASA FMEA NUMBER	IOA ASSESSMENT NUMBER	CRIT	SC	REE	NS C	CRIT	į,		В	С	:	OTHER LEGEND CODE)	ISSU
05-6KA-2137-2	=====================================	2/1R	P	F	Р	======    3/1R	!		≠= F	P	EPD&C	**************************************	=====   X
	ARCS-1554	2/1R	P	F	Ρ	3/1R		P	F	Ρ	EPD&C	3	i x
05-6KA-2151-1	ARCS-1413	3/3	İ			3/2R	1	P	P	Р	EPD&C	1	i x
05-6KA-2153-1	ARCS-1857	3/3	İ			3/2R	jı	Þ	P	P	EPD&C	1	i x
05-6KA-2154-1	ARCS-1858	2/1R	P	F	P	3/2R	İ	•	P	P	EPD&C	2	i x
05-6KA-2154-2	ARCS-1858A	3/3	ĺ			3/2R	İ	>	Ρ	Р	EPD&C	1	i x
)5-6KA-2155-1	ARCS-1859	2/1R	P	F	P	3/2R	İ	•	P	Р	EPD&C	2	i x
05-6KA-2155-2	ARCS-1859A	3/3	İ			3/2R	į	>	P	P	EPD&C	1	i x
05-6KA-2156-1	ARCS-12016X	3/1R	P	F	Р	3/2R	İ	•	Р	P	EPD&C	2	iх
05-6KA-2156-2	ARCS-12017X	3/3	İ			3/2R	js	•	Р	Ρ	İ		i
)5-6KA-2159-1	ARCS-1856	3/3	i			3/2R	i	>	Р	Р	i		i
)5-6KA-2176-1	ARCS-1306	3/1R	P	P	P	ii	i				! 		i
	ARCS-1308	3/1R	Р	Ρ	Р	ii	i						i
	ARCS-1314	3/1R	P	Р	P	ii	i				i İ		! !
		3/1R	Р	P	P	ii	i				1		! !
15-6KA-2176-2		3/1R	P	P	P	11	i				! 		1
		3/1R	   P	P	P		i				; 		1
		3/1R	P	P	P	ii	1				! 		
	4747	3/1R	P	P	P		i				, 		1
		3/1R	l P	P	Р	11 11	i				! 		 
		3/1R	Р	P	P	1 I 1 I	1				1 f		1
	ARCS-1310		, .   Р	Р	P	 	1				! !		1
	ARCS-1312		, .   P	Р	P	11	1				! !		1
)5-6KA-2176A-2	ARCS-1303		, ' 	•	•	11	1				; !		1
	ARCS-1305					1   					l I		1
	ARCS-1311	3/3	l I			11	í				] }		! 1
; }	ARCS-1313	: :				1 I	1				l I		1
 	ARCS-12018X	: - : :	P	P	P	11					] 		1
5-6KA-2177-2	ARCS-12019X	3/1R	P	F	P	3/3					I   EPD&C	2	1
5-6KA-2178-1	ARCS-12020X	3/1R	P	P	P	2/2						_	X
5-6KA-2178-2	ARCS-12021X	3/2R	r I p	-	P	2/2	ļ				EPD&C		X
5-6KA-2179-1	ARCS-1873			r D	-	3/3 					EPD&C	2	X
)		3/1R	P	P	P	11							!
 	ARCS-1875   ARCS-1881	3/1R		P	P	11							!
! !		3/1R		P	2	11	1						ļ
		3/1R		_	P	11	1						į.
		3/1R			P	11	!						ļ .
		: - :		P	P		!						!
 	·	: :		P	P	11	!						!
5-6KA-2179-2	ARCS-1901	3/1R		P	P	    7/7	1					•	
J-0KA-2179-2	ARCS-1872	3/1R		F	P	3/3	!				EPD&C		i x
 	ARCS-1874	3/1R	_	-	2	3/3	!				EPD&C		l x
ļ	ARCS-1880	3/1R	P	r	2	3/3				ļ	EPD&C		X
	ARCS-1884	3/1R	P	F	P	3/3					EPD&C		X
l ı	ARCS-1889	3/1R	P	F	P	3/3	1			ļ	EPD&C		x
ļ	ARCS-1891	3/1R	P	_	P	3/3					EPD&C		x
ļ	ARCS-1896	3/1R			P	3/3					EPD&C		l x
 	ARCS-1900	3/1R	_	_	P	3/3	ļ				EPD&C	2	x
5-6KA-2180-1	ARCS-1877	3/1R	P	P	Р	11	1			1			1

IDE	NTIFIERS	N/	<b>NSA</b>			AO I	RECOM	IENDATIO	ONS	
NASA FMEA NUMBER	IOA   ASSESSMENT NUMBER	CRIT	SCRE	ENS C	CRIT	SCR   A	REENS B C		OTHER Legend Code)	ISSUE
05-6KA-2180-1	ARCS-1879	3/1R	P P	Р		ļ 				1
	ARCS-1883	3/1R	P P	P		ĺ				1
	ARCS-1887	3/1R	P P	P	İİ	Ì				
	ARCS-1893	3/1R	P P	P	İİ	ĺ		]		
	ARCS-1895	3/1R	P P	P	İİ	1				
	ARCS-1899	3/1R	P P	₽	[]	1				
	ARCS-1903	3/1R	P P	P		1				
05-6KA-2180-2	ARCS-1876	3/3				1				
	ARCS-1878	3/3	!		H	1		1		
	ARCS-1882	3/3						1		1
	ARCS-1886	3/3	1			1		1		
	ARCS-1892	3/3				!				1
	ARCS-1894	3/3	1					1		1
	ARCS-1898	3/3	[		11			1		
	ARCS-1902	3/3	1					1		1
05-6KA-2184-1	ARCS-1905	2/2	1		H			1		1
	ARCS-1907	2/2			11	1				1
05-6KA-2184-2	ARCS-1904	3/1R	P F	P	3/3	1		EPD&C	2	X
	ARCS-1906	3/1R	P F	P	3/3	1		EPD&C	2	X
05-6KA-2185-1	ARCS-2001	2/2	l		11	1		l		
	ARCS-2003	2/2	1		11	1		1		
05-6KA-2185-2	ARCS-2000	3/1R	P F	P	3/3	1		EPD&C	2	X
	ARCS-2002	3/1R	P F	P	3/3	1		EPD&C	2	X
05-6KA-2201-1	ARCS-1346	3/3	1		3/2R	P	P P	EPD&C	1	X
	ARCS-1358	3/3			3/2R	P	P P	EPD&C	1	X
05-6KA-2201-2	ARCS-1347	3/1R	P P	P				1		1
	ARCS-1349	3/1R	P P	P	11			1		1
	ARCS-1359	3/1R	P P	P	H	1				1
	ARCS-1361	3/1R	PP	P	11	1				
05-6KA-2201A-1	ARCS-1348	3/3	1		3/2R	P	P P	EPD&C	1	X
	ARCS-1360	3/3	1		3/2R	P	P P	EPD&C	1	X
05-6KA-2202-1	ARCS-1342	3/1R	PP	P	11	1				
Ì	ARCS-1344	3/1R	P P	Р	11			1		
	ARCS-1354	3/1R	PF	Р	11			1		
	ARCS-1356	3/1R	P P	Р	11			1		
05-6KA-2202-2	ARCS-1343	3/1R	PF	P	11	1				1
İ	ARCS-1345	3/1R	PF	P	11	1				1
	ARCS-1355	3/1R	P F	P	11	1		1		
	ARCS-1357	3/1R	P F	P	H	1				1
05-6KA-2202A-1	ARCS-1338	3/1R	P F	P	11	1				
1	ARCS-1340	3/1R	P F	P	H	1		ļ.		!
1	ARCS-1350	3/1R	PF	P	11	ļ		!		İ
	ARCS-1352	3/1R	PF	P	11			1		!
05-6KA-2202A-2	ARCS-1339	3/1R	P	P	11			!		!
1	ARCS-1341	3/1R	PF	Р	]]	ļ		1		!
	ARCS-1351	3/1R	P	P		ļ		İ		!
	ARCS-1353	• •	P	P	<u> </u>	ļ				ļ
05-6KA-2206-1	ARCS-1472	3/3	1		3/2R	P	P P	EPD&C	: 1	l x

IDE	NTIFIERS	N	ASA		IOA RECOM	MENDATIONS	
NASA FMEA NUMBER	IOA   Assessment number	CRIT	SCREENS A B C	CRIT	SCREENS	OTHER	ISSUE
05-6KA-2206-1	ARCS-1474	3/3	 	======   3/2R	P P P		======   X
05-6KA-2206-2	ARCS-1473	3/3	i	3/2R	PPP	EPD&C 1	i x
į	ARCS-1475	3/3	İ	3/2R	P P P	EPD&C 1	i x
05-6KA-2207-1	ARCS-1478	2/1R	P F P	3/2R	PPP	EPD&C 2	i x
İ	ARCS-1484	2/1R	PFP	3/2R	PPP	EPD&C 2	i x
05-6KA-2207-2	ARCS-1479	3/1R	PFP	3/3	l	EPD&C 2	j x
1	ARCS-1485	3/1R	PFP	3/3	ĺ	EPD&C 2	į x
05-6KA-2207A-1	ARCS-1476	3/3	ĺ	3/2R	PPP	EPD&C 1	j x
İ	ARCS-1477	3/3	ĺ	3/2R	PPP	EPD&C 1	j x
İ	ARCS-1482	3/3	ĺ	3/2R	PPP	EPD&C 1	j x
İ	ARCS-1483	3/3	j i	3/2R	PPP	EPD&C 1	X
05-6KA-2208-1	ARCS-1496	2/1R	PFP	3/2R	PPP	EPD&C 2	X
	ARCS-1498	2/1R	PFP	3/2R	PPP	EPD&C 2	X
1	ARCS-1500	2/1R	PFP	3/2R	PPP	EPD&C 2	X
1	ARCS-1502	2/1R	P F P	3/2R	PPP	EPD&C 2	X
1	ARCS-1504	2/1R	PFP	3/2R	PPP	EPD&C 2	X
1	ARCS-1506	2/1R	PFP	3/2R	PPP	EPD&C 2	x
1	ARCS-1508	2/1R	P F P	3/2R	PPP	EPD&C 2	x
1	ARCS-1510	2/1R	P F P	3/2R	PPP	EPD&C 2	X
05-6KA-2208-2	ARCS-1497	3/1R	P P P			1	1
1	ARCS-1499	3/1R	PPP				
1	ARCS-1501	3/1R	P P P		1		1
1	ARCS-1503	3/1R	P P P		1		1
	ARCS-1505	3/1R	P P P				1
	ARCS-1507	3/1R	PPP				1
!	ARCS-1509	3/1R	PPP		l		1
	ARCS-1511	3/1R	PPP		1		
05-6KA-2210-1	ARCS-12024X	3/1R	PFP	3/2R	PPP	EPD&C 2	Х
05-6KA-2210-2	ARCS-12025X	3/2R	PPP	2/2	<u> </u>	EPD&C 4	X
05-6KA-2210A-1	ARCS-12022X	3/1R	PFP	3/2R	PPP	EPD&C 2	x
05-6KA-2210A-2	ARCS-12023X	3/1R	PFP				
05-6KA-2211-1	ARCS-12030X	3/2R		2/2		EPD&C 4	X
05-6KA-2211-2		3/1R		3/3		EPD&C 2	X
05-6KA-2212-1		3/1R					ļ
05-6KA-2212-2		3/1R		3/3		EPD&C 2	X
05-6KA-2213-1	· · · · · · · · · · · · · · · · · · ·	3/1R	P P P				
05-6KA-2213-2		3/1R		3/3		EPD&C 2	X
05-6KA-2213A-1		3/2R		2/2		EPD&C 4	l x
05-6KA-2213A-2	i	3/1R		3/3		EPD&C 2	X
05-6KA-2214-1	: :	3/1R		!			ļ.
1	ARCS-1983	3/1R		!			1
 	i i	3/1R		!			
 	i i	3/1R					1
i 1	i i	3/1R					!
] 	i i	3/1R				<u> </u>	!
<b> </b> 		3/1R					ļ
 		3/1R		1 747			1
05-6KA-2214-2	ARCS-1980	3/1R	P F P	3/3	1	EPD&C 2	X

IDENTI	FIERS	14	NSA				IOA RECOM	ENDATIONS	
NASA	l IOA	CRIT	SCR	REE	NS	CRIT	SCREENS	OTHER	ISSUE
FMEA NUMBER	ASSESSMENT NUMBER	HW/F	٨	В	- 1	HW/F	A B C	(SEE LEGEND CODE)	======
====================================	=====================================	3/1R		.==: F	P	3/3	=====================================	EPD&C 2	x
1	ARCS-1984	3/1R	P	F	Р	3/3		EPD&C 2	x j
1 1	ARCS-1986	3/1R	Р	F	P	3/3	İ	EPD&C 2	x
1	ARCS-1988	3/1R	P	F	P	3/3	i	EPD&C 2	X
! !	ARCS-1990	3/1R	P	F	P	3/3	İ	EPD&C 2	X
! 	ARCS-1992	3/1R	P	F	P	3/3	İ	EPD&C 2	x
1	ARCS-1994	3/1R	[Р	F	P	3/3	Ì	EPD&C 2	X
1 1 05-6KA-2216-1	ARCS-2300	2/2	i			ĺ			1
1	ARCS-2302	2/2	i			i	İ		
1	ARCS-2304	2/2	İ			ĺ	Ì		
i	ARCS-2306	2/2	į				1		
1 05-6KA-2216-2	ARCS-2301	3/3	ĺ			11	I	1	
1	ARCS-2303	3/3	ĺ			H	1		
i	ARCS-2305	3/3	ĺ			11	1		
i	ARCS-2307	3/3	l			11	1		
05-6KA-2217-1	ARCS-1488	3/3	l			3/2R	P P P	EPD&C 1	x
İ	ARCS-1490	3/3	1			3/2R	P P P	EPD&C 1	x
1	ARCS-1492	3/3				3/2R	PPP	EPD&C 1	x
i	ARCS-1494	3/3				3/2R	PPP	EPD&C 1	x
05-6KA-2217-2	ARCS-1489	3/3	1			3/2R	P P P	EPD&C 1	x
İ	ARCS-1491	3/3				3/2R	PPP	EPD&C 1	x
İ	ARCS-1493	3/3				3/2R	PPP	EPD&C 1	x
i	ARCS-1495	3/3				3/2R	PPP	EPD&C 1	x
05-6KA-2219-1	ARCS-1480	2/1R	P	F	P	3/2R	P P P	EPD&C 2	X
İ	ARCS-1486	2/1R	P	F	P	3/2R	PPP	EPD&C 2	x
05-6KA-2219-2	ARCS-1481	3/1R	P	F	P	3/3	ł	EPD&C 2	x
1	ARCS-1487	3/1R	P	F	P	3/3		EPD&C 2	x
05-6KA-2220-1	ARCS-1997	2/2						ļ	!!!
İ	ARCS-1999	2/2	1			11	1		!!!
05-6KA-2220-2	ARCS-1996	3/1R	P	F	P	3/3		EPD&C 2	X
1	ARCS-1998	3/1R	P	F	P	3/3		EPD&C 2	X
05-6KA-2222-1	ARCS-2308	2/2	ł			H	l	Į	!!!
05-6KA-2222-2	ARCS-2309	3/3				[]	ļ		
05-6KA-2224-1	ARCS-12034X	3/1R	P	P	Р	2/2	!	EPD&C 4	X
05-6KA-2224-2	ARCS-12035X	3/1R	P	F	P	]  3/3	!	EPD&C 2	i x i
05-6KA-2251-1	ARCS-1318	3/1R	P	P	Р		!	1	
	ARCS-1320	3/1R	:				1	ļ	
	ARCS-1328	3/1R	•			!!	!	!	! !
1	ARCS-1330	3/1R	P	P	P	11	1		!!!
05-6KA-2251-2	:	3/3	!			Н	ļ		
		3/3	!			11	1		
	ARCS-1329	3/3	!			11	I		1
	·	3/3		_	_	11	1	!	i
05-6KA-2252-1	ARCS-1322	3/1R	:		P	H	Į.		
]	ARCS-1324	3/1R	:			11	1		
!		3/1R	:						
		3/1R		_	_		1	 ! EDD*C 2	1
05-6KA-2252-2	ARCS-1323	3/1R	P	F	Р	3/3	1	EPD&C 2 :====================================	· ^

IDENTIF	IERS	i N	ASA			- [ ]		10	A RECO	DMMENDATIONS	
NASA FMEA NUMBER	IOA Assessment number	CRIT	SC A	REE	NS C		CRIT HW/F	: .	REENS B C	OTHER (SEE LEGEND CODE)	1880
)5-6KA-2252-2	ARCS-1325	=======   3/1R	===   P	=== F	P	= 	3/3	===	22222	= ====================================	= ====:   X
i	ARCS-1333	3/1R	I P	F	Р	ii	3/3	i		EPD&C 2	l x
i	ARCS-1335	3/1R	P	F	P	ii	3/3	i		EPD&C 2	i x
15-6KA-2252-3	ARCS-12340X	3/1R	P	F	P	ii		i			"
i	ARCS-12341X	3/1R	P	F	Р	ii		i		i	i
į		3/1R	Р	F	P	ii		i		i	i
į	ARCS-12343X	3/1R	P	F	Р	ii		i		i	i
15-6KA-2253-1	ARCS-12086X	2/1R	P	F	P	ii	3/3	i		EPD&C 2	i x
· · · · · · · · · · · · · · · · · · ·	ARCS-12088X	2/1R	P	P	P	ii	3/3	i		EPD&C 2	i x
15-6KA-2253-2	ARCS-12087X	3/3			·	ii	٠,٠	i		1	^
	ARCS-12089X	3/3				"		i		1	1
15-6KA-2253A-1	ARCS-12090X	3/2R	P	P	Р	Н		1		-	1
15-6KA-2253A-2	ARCS-12091X	3/3	, · 	•	•	11		1		1	!
5-6KA-2253B-1	ARCS-12092X	3/1R	P	Р	Р	- 1 1		1		· I	1
5-6KA-2253B-2	ARCS-12093X	3/3	, • 	,	•	Ш		1		i !	1
5-6KA-2253C-1	ARCS-12094X	3/1R	P	Р	P	-		! !		1	l I
5-6KA-2253C-2	ARCS-12095X	3/1	<b>"</b>	•	•			l I		1	1
5-6KA-2253D-1	ARCS-12096X	3/1R	   P	ь	P	Н		i I		<u> </u>	1
5-6KA-2253D-2	ARCS-12097X	3/3	] <b>"</b>	r	•	11		l L		<u> </u>	1
5-6KA-2253E-1	ARCS-12098X	3/1R	P	=	P	11	3/3	i I		l Enner 2	
5-6KA-2253E-2	ARCS-12099X	2/1R	l D	E	P	11	2/2	l I		EPD&C 2	X
5-6KA-2253F-1	ARCS-12100X	3/1R	r   6	-	P	11	3/3	 		EPD&C 3	X
5-6KA-2253F-2			ן ר ה	r e	P	11	3/3	] 1		EPD&C 2	X
5-6KA-2254-1	:	3/1R     2/1R	F		P	11	3/3	! 		EPD&C 2	X
		2/1R	, r   D	-	P	11	3/3	] 		EPD&C 2   EPD&C 2	X
  5-6KA-2254-2	•	3/3	•	٠	f	11	3,3	i i		Erbac 2	X
	ARCS-12110X					11		i !		!	!
5-6KA-2254A-1	ARCS-12111X	1 1	D	D	P	- 11		! !		!	!
5-6KA-2254A-2	ARCS-12112X	: :	F	r	r			) 1		!	-
5-6KA-2254B-1	ARCS-12113X	3/1R	P	P	Р	11		} !		i	!
5-6KA-22548-2	ARCS-12114X	3/1	•	r	r	11		! !		1	1
5-6KA-2254C-1	ARCS-12115X	3/1R	Р	P	P	- 11		! :		1	!
5-6KA-2254C-2	ARCS-12116X		r	_	r	11		[ i		1	!
5-6KA-2254D-1	ARCS-12117X	: :	P	P	ь			! !		1	!
5-6KA-2254D-2	!	: :	•	-	•	11		! !			!
5-6KA-2254E-1	ARCS-12118X   ARCS-12119X	: :		_	D		3/3	l 1		EDDIC 3	"
5-6KA-2254E-2		:	P	F	P		3/3	1		EPD&C 2	X
5-6KA-2254F-1		: :	P	F	P		2/2	l 1		EPD&C 3	X
5-6KA-2254F-2		: :	P	F	P		3/3 3/10			EPD&C 2	X
5-6KA-2255-1		: :	P	F	P		3/1R	P	F P	EPD&C 3	X
3 OKA-2233-1		: :	P	F	P		3/3			EPD&C 2	X
; 	ARCS-12194X	: :	P	F	P	П	3/3	1		EPD&C 2	X
l i	ARCS-12208X	: :	P	F	P	11	3/3			EPD&C 2	X
	ARCS-12210X	: :	P	F	P	П	3/3			EPD&C 2	X
	ARCS-12224X	: :	P	F	P	П	3/3			EPD&C 2	X
ļ	ARCS-12226X	: :	P	F	P	11	3/3			EPD&C 2	X
ļ	ARCS-12240X	: :	P	F	P	11	3/3			EPD&C 2	x
F-4WA-33EE 3	ARCS-12242X	: :	Р	F	P	H	3/3		_	EPD&C 2	x
5-6KA-2255-2	ARCS-12193X	3/3				ш	3/2R	P	РР	EPD&C 1	X

IDEN	ITIFIERS	N/	\SA					10	A RI	ECOM	MENDATIONS		
NASA FMEA NUMBER	IOA   ASSESSMENT NUMBER	CRIT    HW/F	SCI	REE	NS C		CRIT HW/F	SC A	REE!	NS C	OTHER CSEE LEGEND CO	DE)	ISSUE
	1	======	*===:	:22:	====		222222			====	=====================================	===== 	X
05-6KA-2255-2	ARCS-12195X	3/3					3/2R	P   P	P P	P P	EPD&C 1	i	X
	ARCS-12209X	3/3	i				3/2R 3/2R	l P	P	P	EPD&C 1	1	X
	ARCS-12211X	3/3	 			Н	3/2R	P	P	P	EPD&C 1	i	x
	ARCS-12225X	3/3	ŀ				3/2R	l P	P	P	EPD&C 1	i	X
	ARCS-12227X	3/3    3/3	!			11	3/2R	l P	P	P	EPD&C 1	i	X
	ARCS-12241X   ARCS-12243X	3/3    3/3	! !			11	3/2R	l P	P	Р	EPD&C 1	i	X
05 4VA 33554-1	ARCS-12196X	3/3	1 			11	) <b>3, c</b>	, . 	•	•	1	i	
05-6KA-2255A-1	ARCS-12190X	3/3	! !			Н		! [			* 	i	
	ARCS-12228X		i 1					! 			i	i	
	ARCS-12244X	3/3	! 					<u>.</u>			i	i	
05-6KA-2255A-2	ARCS-12197X	3/3    3/3	! 					i			i	i	
UJ-DRM-EEJJM-E	ARCS-12177X	3/3    3/3									i	i	
	ARCS-12279X	3/3    3/3	<u> </u>					i			i	i	
	ARCS-12245X	3/3	ĺ			i		i			İ	ĺ	
05-6KA-2255B-1	ARCS-12198X	3/1R	,   P	Р	Р	i		Ì			İ	Ì	
OJ ORA ELJJE (	ARCS-12214X	3/1R	P	P	Р	i		ĺ			i	Ì	
	ARCS-12230X	3/1R	l P	P	P	i	i	ί			i		
	ARCS-12246X	3/1R	Р	Р	Р	i		İ				ĺ	
05-6KA-2255B-2	ARCS-12199X	3/3	i			ί	İ	i					
OJ ORA ELIJI E	1	3/3	i			i	i I	i			İ		
	ARCS-12215X	1 3/3	i			i	į	i			Ì	1	
	ARCS-12247X	3/3	i			İ	İ	İ			Ì		
05-6KA-2255C-1	ARCS-12200X	]  3/1R	P	P	P	İ	ĺ	İ					
	ARCS-12216X	3/1R	P	Ρ	P	ĺ	ĺ						
,	ARCS-12232X	3/1R	P	P	P	1	l						
	ARCS-12248X	3/1R	P	Р	P	Ì					1	!	l
05-6KA-2255C-2	ARCS-12201X	3/3	1			1	1				1		
	ARCS-12217X	3/3				1	1						
	ARCS-12233X	3/3				1	1				1		
	ARCS-12249X	3/3	1				1	1					
05-6KA-2255D-1	ARCS-12202X	3/1R	P	P	P	1	1	1			1		
	ARCS-12218X	3/1R	P	P	P		1	1					ĺ
	ARCS-12234X	3/1R	P	P	P			1					ļ
	ARCS-12250X	3/1R	P	P	Ρ	-		1			1		!
05-6KA-2255D-2	ARCS-12203X	3/3	1			1	1	i			!		ļ
	ARCS-12219X	3/3	1			١	1	1			!		!
	ARCS-12235X	3/3	1			1	ļ				!		!
	ARCS-12251X	3/3	1			١							!
05-6KA-2255E-1	ARCS-12204X	3/1R	:	F	Р	١	3/3	!			EPD&C 2		X
	ARCS-12220X	3/1R	•	F		ļ	3/3	!			EPD&C 2		X
	ARCS-12236X	3/1R	:		P	ļ	3/3				EPD&C 2		) X
	ARCS-12252X	3/1R	1	F	P	ļ	3/3		_	_	EPD&C 2		X
05-6KA-2255E-2	ARCS-12205X	3/1R		F	P	١	3/1R	P	F	P	EPD&C 3		X
	ARCS-12221X	3/1R		F	P	1	3/1R	:	F	P	EPD&C 3		X
	ARCS-12237X	3/1R	P		P	ļ	3/1R	P	_	P	EPD&C 3		X
	ARCS-12253X	3/1R	P	F	P	-	3/1R	P	F	Р	EPD&C 3		X

IDEN	ITIFIERS	N	ASA		IOA RECOM	MENDATIONS	
NASA FMEA NUMBER	IOA   ASSESSMENT NUMBER	CRIT	SCREENS	CRIT    HW/F	SCREENS	OTHER (SEE LEGEND CODE)	ISSUE
05-6KA-2255F-1	ARCS-12206X	======    3/1R	========   P	======    3/3	=====================================	=====================================	: ======   X
İ	ARCS-12222X	3/1R	PFP	3/3	i	EPD&C 2	i x
İ	ARCS-12238X	3/1R	PFP	3/3	i	EPD&C 2	i x
İ	ARCS-12254X	3/1R	PFP	3/3	İ	EPD&C 2	X
05-6KA-2255F-2	ARCS-12207X	3/1R	P F P	3/1R	PFP	EPD&C 3	X
1	ARCS-12223X	3/1R	PFP	]  3/1R	PFP	EPD&C 3	X
ĺ	ARCS-12239X	3/1R	P F P	3/1R	PFP	EPD&C 3	i x
	ARCS-12255X	3/1R	P F P	3/1R	P F P	EPD&C 3	x
05-6KA-2257-1	ARCS-12036X	3/1R	PFP	3/3	i	EPD&C 2	X
05-6KA-2257-2	ARCS-12037X	3/3	İ	3/2R	PFP	EPD&C 6	İx
05-6KA-2257A-1		3/1R	PFP	    3/3	i	EPD&C 2	l x
05-6KA-2257A-2		3/2R	PPP	ii	i	,   	ì
05-6KA-2257B-1	i	3/2R	P P P	ii	i		i
	ARCS-12048X	3/2R	PPP	İİ	İ		i
05-6KA-2257B-2	ARCS-12047X	3/2R	PPP	İİ	i		i
	1	3/2R	PPP	ii	i		
05-6KA-2257C-1	•	3/2R	PPP	İİ	i		i
		3/2R	PPP	ii	i	<u> </u>	i
05-6KA-2257C-2	·	3/3	İ	ii	i	İ	İ
	i	3/3	İ	ii	: 	İ	i I
05-6KA-2257D-1	ARCS-12040X	3/1R	PPP	ii			<u>.</u>
	ARCS-12058X	3/1R	PPP	ii	i	! 	
05-6KA-2257D-2	ARCS-12041X	3/3		ii	i	; 	i
	ARCS-12059X	3/3		ii	I	Í	1
05-6KA-2257E-1	ARCS-12042X	3/3		ii		<u> </u>	
	ARCS-12060X	3/3	Ì	ii	İ	<b>!</b> •	
05-6KA-2257E-2	ARCS-12043X	3/3		ίi	İ	ĺ	i
	ARCS-12061X	3/3		ii	ĺ	j	i
05-6KA-2257F-1	ARCS-12062X	3/1R	PPP	ii	ĺ		i
05-6KA-2257F-2	ARCS-12063X	3/2R	PPP	3/3	İ	EPD&C 2	i x
05-6KA-2257G-1	ARCS-12064X	3/3		İ	i		
05-6KA-2257G-2	ARCS-12065X	3/3		ii	İ		: !
05-6KA-2257H-1	ARCS-12066X	3/2R	PPP	ij	£		
05-6KA-2257H-2	ARCS-12067X	3/3	İ				; i
05-6KA-2258-1	ARCS-12052X	3/2R	PPP	2/2		EPD&C 4	i x
05-6KA-2258-2	ARCS-12053X	3/3		i i			
05-6KA-2258-3	ARCS-12344X	3/2R	PPP	2/2		EPD&C 4	i x
05-6KA-2259-1	ARCS-1915	3/1R	PFP	i			
	ARCS-1923	3/1R	PFP	i			) 
	ARCS-1927	3/1R	PFP	İ			
	ARCS-1935	3/1R	PFP	i			
	ARCS-1949	3/1R		<b> </b>	· 		i
	ARCS-1955	3/1R	PFP	l <b>i</b> i			i
	ARCS-1961	3/1R	PFP	i i			İ
	ARCS-1969	3/1R	PFP	il i			İ
05-6KA-2259-2	ARCS-1914	3/3	İ	i i			
	ARCS-1922	3/3	İ	į i			
	ARCS-1926	3/3	i	i i			

IDENT	IFIERS	N/	\SA			 	IOA RECOM	1ENDATIONS	
NASA FMEA NUMBER	IOA   ASSESSMENT NUMBER	CRIT   HW/F	SCRE			CRIT	SCREENS A B C	OTHER  (SEE LEGEND CODE)	ISSUE   
 05-6KA-2259-2	=   ==================================	======    3/3	=====		- 				
	ARCS-1948	3/3	İ		i	İ			
	ARCS-1954	3/3	İ		İ	j i			
	ARCS-1960	3/3			İ	į			1
	ARCS-1968	3/3	Ì		Ì	į ·			1
05-6KA-2259A-1	ARCS-1917	3/1R	PF	: Р	İ	1			l
	ARCS-1925	3/1R	PF	: р	Ì	1			1
	ARCS-1929	3/1R	P F	: Р	-	1			1
	ARCS-1937	3/1R	PF	: Р	-		i		
	ARCS-1951	3/1R	P F	: Р					1
	ARCS-1957	3/1R	PF	P	1	1			
	ARCS-1963	3/1R	P F	: Р	-			l	
	ARCS-1971	3/1R	P	P	-1		1	l	ļ
05-6KA-2259A-2	ARCS-1916	3/3	1		-			1	ļ
	ARCS-1924	3/3	l		1	1		!	
	ARCS-1928	3/3			-			!	!
	ARCS-1936	3/3			1	1		!	!
	ARCS-1950	3/3			ŀ				!
	ARCS-1956	3/3	j		١	!			ļ
	ARCS-1962	3/3			إ	!	!		ļ
	ARCS-1970	3/3			١		[		
05-6KA-2260-1	ARCS-12345X	3/1R	P	F P	!	]	!	!	]
	ARCS-12346X	3/1R	P	F P	ļ	!	<u> </u>	!	
	· •	3/1R	P	F P	١	!	<u> </u>	ļ	1
	ARCS-12350X	3/1R	:	F P	١	!	1	1	1
	•	3/1R		F P	1	1	1	<u> </u> 	1
	ARCS-12354X	3/1R		F P		1	ļ	1	1
	ARCS-12356X	3/1R	P	F P	ļ	1	1	 	! !
	ARCS-12357X	3/1R	P	r P	ļ		1	ļ F	! !
	ARCS-12358X	3/1R	P	7 P	ļ	1	1	1	1
	ARCS-1909	3/1R	P	r P		i	1	 	1
	ARCS-1911	]  3/1R	:	FP = D		 	1	! !	
] 	ARCS-1931   ARCS-1941	3/1R    3/1R	l P	FP FP	1	Ī		1	i
	ARCS-1941	3/1R	'   P	, , F P	i	1	1	1	i
	ARCS-1945	3/1R	: _	F Р		1	1		i
	ARCS-1945	3/1R	: -	F Р	i	1	ļ		i
 	ARCS-1905	3/1R		 F Р	ı		İ		i
   05-6KA-2260-2	ARCS-1973	3/1	ί.	•	ľ	i			i
US OKN-2200'2	ARCS-1910	3/3	i		i	i	i	i	i
I 	ARCS-1930	3/3	i			ii	İ	i	į
! 	ARCS-1940	3/3	i			i			į
! }	ARCS-1942	3/3	i			ii	İ	İ	1
! 	ARCS-1944	3/3	i			i	İ		1
İ	ARCS-1964	3/3	i			Í	İ		l
i	ARCS-1974	3/3	i			ii	Ì		1
05-6KA-2261-1	ARCS-12130X	2/1R	į P	F P		3/3		EPD&C 2	X
i	ARCS-12132X	2/1R	İР	F P		3/3	1	EPD&C 2	x

IDENTI	FIERS	N/	ASA				IOA RECOM	MENDATIONS	
NASA FMEA NUMBER	IOA ASSESSMENT NUMBER	CRIT	SC   A	REE B	NS C	CRIT	SCREENS A B C	OTHER (SEE LEGEND CODE)	ISSUE
05-6KA-2261-1	ARCS-12151X	=======    2/1R	====   P	##= F	P	======    3/3		=====================================	=======   X
	ARCS-12153X	2/1R	P	F	P	3/3	İ	EPD&C 2	X
05-6KA-2261-2	:	3/3	i				<u>'</u> 		ì
	:	3/3	i			i			i
İ	ARCS-12152X	3/3	į			ii	ĺ		i
İ	ARCS-12154X	3/3	İ			ii	ĺ		j
05-6KA-2261A-1	ARCS-12134X	3/1R	P	P	Ρ	ĺ	ĺ		İ
	ARCS-12155X	3/1R	P	P	P			İ	İ
05-6KA-2261A-2	ARCS-12135X	3/3	ĺ			i i			İ
1	ARCS-12156X	3/3	ĺ						Ì
05-6KA-2261B-1	ARCS-12136X	3/1R	P	P	P	1			İ
1	ARCS-12157X	3/1R	P	P	P				İ
05-6KA-2261B-2	ARCS-12137X	3/3							Ì
1	ARCS-12158X	3/3	]						Ì
05-6KA-2261C-1	ARCS-12138X	3/1R	P	P	P				Ì
1	ARCS-12159X	3/1R	P	P	P				İ
05-6KA-2261C-2	ARCS-12139X	3/3							
1	ARCS-12160X	3/3	!			1			1
05-6KA-2261D-1	ARCS-12140X	3/1R	P	Ρ	P				1
1	ARCS-12161X	3/1R	P	Ρ	P				1 .
05-6KA-2261D-2	ARCS-12141X	3/3							1
1	ARCS-12162X	3/3	1				]		1
05-6KA-2261E-1	ARCS-12142X	3/1R	P	F	P	3/3		EPD&C 2	x
		3/1R	P	F	P	3/3		EPD&C 2	X
05-6KA-2261E-2		3/1R	Р	F	P	3/1R	P F P	EPD&C 3	x
		3/1R	P	F	P	3/1R	PFP	EPD&C 3	X
05-6KA-2261F-1		3/1R	Р	F	P	3/3		EPD&C 2	X
	ARCS-12165X	3/1R	ΙP	F		3/3		EPD&C 2	X
05-6KA-2261F-2	ARCS-12145X	3/1R	P	F	Р	3/3		EPD&C 2	X
1 05 444 0045 4	ARCS-12166X	3/1R	P	F	P	3/3		EPD&C 2	x
05-6KA-2265-1	ARCS-12347X	3/1R	P	F	P				
1	ARCS-12348X	3/1R	:	F	P	!!!			!
1	1 107500	3/1R		F	P				
		3/1R	•	•	P	! !			
! !		3/1R	:	F	P	1 1			
1		3/1R	:	F	r	1			
1	:	3/1R		F	P	! !			
1		3/1R		F	P	1 1			
1	!	3/1R		F	P	[			
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05-6KA-2265-1		3/1R		F	г   р (	i	 		!   ! !
	ARCS-1959	3/1R		F	r I	1 I	 		 
	ARCS-1967	3/1R		F	r i	, l	 		 
	ARCS-1973	3/1R		F	·	i l	 		 
05-6KA-2265-2	ARCS-1912	3/3	' 	•	' '	1   	 		[ 
<u></u>	ARCS-1921	3/3			1		l I		i   
	ARCS-1932	3/3			i		 		, ! [
1	ARC3 - 1736	1 2/2	l		-		Į		

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OJ OKA ELOJ E	ARCS-1952	3/3	i			i	İ			İ		ĺ
	ARCS-1958	3/3	İ			i	ĺ					ĺ
	ARCS-1966	3/3	i			i	i			i		j
	ARCS-1972	3/3	i			i	i			, 		Ì
05-6KA-2267-1	ARCS-1326	3/3	i			3/2R	P	P	Р	EPD&C	1	x
03-0KK-2201-1	ARCS-1336	3/3				3/2R	:	P	Р	EPD&C	1	i x
05-444-2247-2	ARCS-1327	3/3	i			1	İ	·	Ť	, 		i
05-6KA-2267-2	ARCS-1327	3/3	¦				! !			i		İ
05 (** 22/0 4	• ***	3/3    3/3	1			    3/2R	l I P	Р	P	!   EPD&C	1	i x
05-6KA-2268-1	ARCS-12123X	3/3    3/1R	l I b	D	Р	3/2	¦ '	•	•	EPD&C		l x
05-6KA-2268-2	ARCS-12124X	!!	1	r	r	3/3    3/2R	l I P	P	P	EPD&C		X
05-6KA-2269-1	ARCS-1448	3/3	1			3/2R	P	P	P	EPD&C		i x
	ARCS-1452	3/3	1			3/2R    3/2R	P	P	P	EPD&C		l X
	ARCS-1456	]] 3/3	1				l P	P	P	EPD&C		1 ^
	ARCS-1460	3/3		_	_	3/2R	"	•	r	Erbac	•	, ^ 
05-6KA-2269-2	ARCS-1449	3/1R	P	P	P	[ <del> </del> 	 			! !		1
	ARCS-1453	3/1R	P		P		1			l L		i i
	ARCS-1457	3/1R	P		P					!		]
	ARCS-1461	3/1R	Į P	Р	Р		!			!		] 
05-6KA-2270-1	ARCS-12361X	2/2	!				ļ			]		1
	ARCS-12362X	2/2	!				!					1
	ARCS-1977	2/2	!			!!	!			!		j I
	ARCS-1979	2/2	!			H	ļ .			ļ		!
05-6KA-2270-2	ARCS-1976	3/3	1			!!	!					!
	ARCS-1978	3/3				П	ļ.			ļ		ļ.
05-6KA-2271-1	ARCS-1919	3/1R	P	F	P		1			ļ		
	ARCS-1947	3/1R	P	F	Р		!					!
05-6KA-2271-2	ARCS-1918	3/3					l			ļ		!
	ARCS-1946	3/3					1			1		ļ .
05-6KA-2279-1	ARCS-12054X	3/3	ı			3/2R	P	Ρ	P	EPD&C	1	X
	ARCS-12056X	3/3				3/2R	P	P	Ρ	EPD&C	1	j x
05-6KA-2279-2	ARCS-12055X	3/3					1			1		1
	ARCS-12057X	3/3	1			11				1		l
05-6KA-2280-1	ARCS-12072X	3/1R	P	P	P	2/2	1			EPD&C		X
05-6KA-2280-2	ARCS-12073X	3/1R	P	F	P	3/3				EPD&C	2	X
05-6KA-2302-1	ARCS-12322X	2/1R	P	P	P		1			1		1
	ARCS-12324X	2/1R	P	Ρ	P	11	1			1		
05-6KA-2303-1	ARCS-12321X	2/1R	P	P	P	11	1			1		
	ARCS-12323X	2/1R	P	P	P	11	1			1		1
NONE	ARCS-12068X	İİ	1			3/1R	P	N/	P	EPD&C	5	X
	ARCS-12069X	İİ	1			3/3				EPD&C	5	X
	ARCS-12070X	ii	1			3/1R	P	N/	P	EPD&C	5	1 x
	ARCS-12071X	İİ	İ			3/3				EPD&C	5	X
	ARCS-12074X	ii	İ			3/2R	P	P	P	EPD&C	5	X
	ARCS-12075X	İİ	i			3/2R	Į P	P	P	EPD&C	5	x
	ARCS-12325X	ii	i			ii	İ			1		1
	ARCS-12326X	ii	i			ii	ĺ			1		
	ARCS-12327X	ii	i			ii	i			İ		1

IDENTI	FIERS	N/	ASA		IOA RECOM	MENDATIONS	
NASA FMEA NUMBER	IOA     ASSESSMENT NUMBER	CRIT	SCREENS A B C	CRIT      HW/F	GCREENS	OTHER	ISSU
NONE	ARCS-12328X			<del></del>   		<b></b>	: ====: 
	ARCS-12329X	1		2/1R	⇒ P P	EPD&C 5	į x
	ARCS-12330X	1		3/3		EPD&C 5	į x
	ARCS-12331X			3/2R	> P P	EPD&C 5	į x
	ARCS-12332X	1		2/2		EPD&C 5	i x
	ARCS-12333X	ĺ		3/1R	,	EPD&C 5	X
	ARCS-12334X			3/1R	NA P	EPD&C 5	x
	ARCS-12335X			3/1R	PP	EPD&C 5	x
	ARCS-12336X	Ì		3/2R	ΡР	EPD&C 1,5	i x
	ARCS-12337X	ĺ		3/2R	P P	EPD&C 1,5	i x
	ARCS-12338X	İ	İ	3/2R	РΡ	EPD&C 1,5	i x
	ARCS-12339X	İ	İ	3/2R	РР	EPD&C 1.5	i x
	ARCS-1644	i i		3/3		EPD&C 5	i x
	ARCS-1646	į į		3/3		EPD&C 5	i x
	ARCS-1650	i i		3/3		EPD&C 5	x
	ARCS-1662	i i		3/3		EPD&C 5	i x
	ARCS-1664	j i		3/3		EPD&C 5	i x
	ARCS-1668	i i		3/3		EPD&C 5	i x
	ARCS-2043	i i					i
	ARCS-2095	i i		i i			i
	ARCS-2263	i i		i			i
	ARCS-2264	i i	i	i			Ì
	ARCS-2265	i		i			1
	ARCS-2266	i		i			1
	ARCS-2267	i i		i			1
	ARCS-2286	i		3/2R	• РР	EPD&C 5	l x
	ARCS-2287			3/2R	РР	EPD&C 5	X
	ARCS-2288	i i		3/2R	P P	EPD&C 5	l X
	ARCS-2296	i i	_	3/3		EPD&C 5	l x
	ARCS-2297	i i		3/2R	PP	EPD&C 5	X
	ARCS-2334	; ! ;		3/2R	FP	EPD&C 5	X
	ARCS-2335	, ' 	! !	3/3	• • •	EPD&C 5	X
	ARCS-2336	, , 	! !	3/2R	> F P	EPD&C 5	^   X
	ARCS-2337	; ;	, 	3/3	. ,	EPD&C 5	l ^
	ARCS-2338	· '	1 1	3/2R	, F P	EPD&C 5	l ^
	ARCS-2339	! ! ! !	,	3/3	, , ,	EPD&C 5	l ^
	ARCS-2340	, l	 	2/2		EPD&C 5	i X
	ARCS-2341	: ! [ ]	1	3/3	i I	EPD&C 5	
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## APPENDIX G

SUMMARY OF RCS ANALYSIS AND ASSESSMENT SHEETS SUPERSEDED BY APPENDIX E DUE TO RE-ANALYSIS

APPENDIX G
SUMMARY OF ASSESSMENT SHEETS SUPERCEDED BY APPENDIX F DUE TO RE-ANALYSIS

11 11 IDENTIFIERS NASA IOA RECOMMENDATIONS IOA | CRIT | SCREENS | CRIT | SCREENS | OTHER NASA FMEA NUMBER ASSESSMENT NUMBER | HW/F | A B C | HW/F | A B C | (SEE LEGEND CODE) FRCS-1058 Н П | FRCS-1059 Ш П | FRCS-1060 -11 11 | FRCS-1061 Ш | FRCS-1062  $\mathbf{H}$ Ш FRCS-1063 Ш 11 FRCS-1064 П FRCS-1065 Ш П FRCS-1066 FRCS-1067 11 FRCS-1068 11 FRCS-1069 Ш FRCS-1070 11 FRCS-1071 Ш 11 FRCS-1072 11 П | FRCS-1073 П FRCS-1074 Ш 11 FRCS-1075 П FRCS-1076 Н FRCS-1077 Н FRCS-1078 Ш 11 FRCS-1079 Ш | FRCS-1080 Ш FRCS-1081 11 | FRCS-1082 П FRCS-1083 П | FRCS-1084 П FRCS-1085 Ш | FRCS-1086 11 | FRCS-1087 Ш FRCS-1088 11 | FRCS-1089 11 FRCS-1090 11 Ш FRCS-1091 Ш FRCS-1092 Ш П FRCS-1093 Ш | FRCS-1094 Н FRCS-1095 Н FRCS-1096 Н Ш FRCS-1097 11 П | FRCS-1098 11 | FRCS-1099 11 11 | FRCS-1100 | FRCS-1101

IDENTI	FIERS	į n	ASA	11		IOA RECOM	1ENDATIONS	ļ
NASA	IOA	CRIT	SCREENS	 	CRIT	SCREENS	OTHER	   ISSUE
FMEA NUMBER	ASSESSMENT NUMBER	HW/F	A B C	: :	HW/F	A B C	(SEE LEGEND CODE)	1330E   
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i	FRCS-1102	i	1	- ii	i			, , 
i	FRCS-1103	i	i	- ii	i			
<u>i</u>	FRCS-1104	i	i	ii	ĺ			İ i
į	FRCS-1105	i	i	ii	i			
	FRCS-1106	ĺ	i	ii	i			i
<b>j</b>	FRCS-1107	i	İ	- ii	i			i i
İ	FRCS-1108		Ì	ii	i			i i
1	FRCS-1109	İ	Ì	H	i			İ
1	FRCS-1110	1	Ì	H	j			
	FRCS-1111	İ	Ì		ı			İ
1	FRCS-1112	ĺ	ĺ	H	İ			İ
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	FRCS-1115	ĺ	İ	ΞĤ	į			İ
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	FRCS-1119		1	- 11	]			ĺ
l I	FRCS-1120		1		ĺ			İ
	FRCS-1121	1	1	- 11	-	1		
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	FRCS-1123		1	- 11	1			
	FRCS-1124	1		- 11	- 1			
	FRCS-1125		1	- 11	1	1		1
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	FRCS-1127		1	- []	1			
	FRCS-1128							
	FRCS-1129			- 11	1			
	FRCS-1130			11	I			
	FRCS-1131		1	11	1	l		
	FRCS-1247			11	1			1
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IDENT	IFIERS	NA	ISA	    	IOA RECOM	IENDATIONS	
NASA	l IOA	CRIT	SCREENS	CRIT	SCREENS	OTHER	ISSUE
FMEA NUMBER	ASSESSMENT NUMBER		A B C	HW/F	ABC	(SEE LEGEND CODE)	i i
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	FRCS-1265	i I		ii	i		i i
1	FRCS-1266	i		ii	į		i i
	FRCS-1267	i		ii	<b>.</b>		1
	FRCS-1268	i i		İİ	j i		1
<u> </u>	FRCS-1269	i i		İİ	,		1
	FRCS-1270	i i		i i	İ		
i	FRCS-1271	İ		11	İ		
i	FRCS-1272	1		11	1		
İ	FRCS-1273			Н	[		
İ	FRCS-1274				1		
	FRCS-1275	1			1		
j	FRCS-1276		j		1		
İ	FRCS-1277		1		1		
İ	FRCS-1278		!		1		
İ	FRCS-1279		j	11			
	FRCS-1280		l				
1	FRCS-1281		1	11	!		!!
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	FRCS-1283	1	[		1		!!!
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	FRCS-1288		!	!!	ļ		
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1	FRCS-365   FRCS-366	<b> </b>   <b> </b>	1	11	1	! 	1 1
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	FRCS-368	i 1 I 1	1	11	1	1 1	 
1	FRCS-369			11	1	! 	
1	FRCS-370	 	! . !	11	1	l Î	
1	FRCS-371	l I	i	11	1	1 	1
1	FRCS-372	!	1			1	1
	FRCS-383	'	i	ii	i	İ	i
	FRCS-384	' ' 	i	ii	i	i	i
	FRCS-532	'		ii	i	İ	i
	FRCS-533	ii	i	ii	i		i
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	FRCS-535	ii	İ	ii	i	İ	i
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NASA FMEA NUMBER	IOA   ASSESSMENT NUMBER	•	SCREENS	    CRIT    HW/F	SCREENS	OTHER (SEE LEGEND CODE)	ISSUE
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i	FRCS-538	i	l	i	ĺ		i i
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i	FRCS-541	ì	j	i	ĺ		İ
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1	FRCS-559	1					
1	FRCS-560			1	1		
1	FRCS-561	1					
	FRCS-562	1					
1	FRCS-563	1	1		1		
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1	FRCS-565	1		1			
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1	FRCS-567	1			1		
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1	FRCS-667		 	<b> </b>   <b> </b>			[
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1	FRCS-688	-	] 	<b> </b>   <b> </b>	1		
1	FRCS-689	I	l i	I	1		

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NASA FMEA NUMBER	IOA ASSESSMENT NUMBER	CRIT	SCREENS		CRIT HW/F	SCREENS A B C	(SEE LEGEND CODE)	ISSUE					
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	FRCS-690	 	[ [	11		 		l					
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	FRCS-692	11	1	11		 							
	FRCS-693   FRCS-694	 	1	11		1		l I					
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	FRCS-695		 	11		1		1					
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	FRCS-774	-    -	 	11		l i		] 					
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	FRCS-813	11	I	1	i	1	ı	i					

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NASA FMEA NUMBER	IOA ASSESSMENT NUMBER		CRIT	SC A	REENS B C	   	CRIT   HW/F	   	SCREENS A B C	OTHER (SEE LEGEND CODE)	ISSUE
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i	FRCS-814	Ï		1		ĺ	1	1			1
i	FRCS-815	II		l		1		1			1
i	FRCS-816	II		l		1				1	
i	FRCS-817	11				1	1	1		1	
i	FRCS-818	11				-	1	١			!!
İ	FRCS-819	П				-	1			1	!!!
İ	FRCS-820	11	]	1		1	1				!!
ļ	FRCS-821					1	1				!!!
İ	FRCS-822		1	1			1	1			!!
	FRCS-823	$\ $		1			1	1		<u> </u>	
İ	FRCS-824		ļ			١	1	ļ			
İ	FRCS-825					۱				<u> </u>	!!
	FRCS-826			1		١	ļ	1			!!
1	FRCS-827	1	l			١	!	ļ		!	!!
1	FRCS-828		l	1		١	!	ļ		!	1
1	FRCS-829	1	1	1		1	!	ļ			
1	FRCS-830			l		١	!	ļ		ļ	
1	FRCS-831	۱		1		ļ	!	ļ			
1	FRCS-832	ļ	!	ļ		ļ		1			
1	FRCS-833	l				I	1	ļ			
	FRCS-834	1	!	[		١	İ	1			
1	FRCS-835	1	]	ļ.		1	!	ļ			1 1
1	FRCS-836	ļ	ļ	!		١	!	ļ			
1	FRCS-837	-	1	ļ		ļ	!	ļ			
	FRCS-838	!	!	ļ		ļ		!			1 1
	FRCS-839	ļ				ļ		ļ			
	FRCS-840	ļ		ļ		إ		١			
1	FRCS-884		1	ı		1		1			

IDENT!	FIERS	N/	ASA		IOA RECOM	MENDATIONS	
NASA FMEA NUMBER	IOA     ASSESSMENT NUMBER	•	•	CRIT	SCREENS	OTHER (SEE LEGEND CODE)	ISSUE
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İ	ARCS-1398	İ	1 i	i			i i
İ	ARCS-1399	İ	İ	i	İ		i i
•	ARCS-1400	İ	j i	İ İ	Ì	İ	i i
1	ARCS-1401	Ì	ĺ	j j	İ		i i
1	ARCS-1402		i i	j j	ĺ		i i
1	ARCS-1403		l i			İ	i i
1	ARCS-1404	1		1		j	i i
1	ARCS-1405	1		1			i i
	ARCS-1406	1		1			İ İ
l	ARCS-1407	1					l İ
I	ARCS-1408	1		1			j j
	ARCS-1409			1			
1	ARCS-1410	1		1			1 1
1	ARCS-1411	1					
1	ARCS-1412	1		1			1
!	ARCS-1426			1 1			
!	ARCS-1427			1 1			<b>l</b> 1
!	ARCS-1428						
!	ARCS-1429						
	ARCS-1430						
!	ARCS-1431	[					
1	ARCS-1432	!					
	ARCS-1433	!					
 	ARCS-1434			!!!			
!	ARCS-1435		! !	! [	•		
İ	ARCS-1436		! !	!!!			l i
}	ARCS-1437			!!!			
1	ARCS-1438	l i					
1	ARCS-1439	] ;	1				!
1	ARCS-1440   ARCS-1441	[	 	1 1			
1	ARCS-1441	] 					
<u> </u>	ARCS-1443	] i		[			
	ARCS-1445	]   					
1	ARCS-1445	) 	; 	1 1			
	ARCS-1446	1 I		1 1			
i	ARCS-1447	! !	i	1 1 1 1		 	
i	ARCS-1450	; ; ; ;		i ! 1 !			<b>!</b>   <b>!</b>
i	ARCS-1451		i				<u> </u>
i	ARCS-1454	! ! 	, 	! ! 		 	
Ì	ARCS-1455	' '		' ! 			1
İ	ARCS-1458			; ¦			1
	ARCS-1459	'	i	: ' [			1
	ARCS-1462	'	i	i i		! !	1
	ARCS-1463	, ' 	i	i i	,	<u> </u>	!
	ARCS-1464	[	i	i i		 	1
1	ARCS-1465		i	i i		! !	1
	ARCS-1466	į į	i	i i			i
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IDENTI	FIERS	NA	ISA			IOA RECOMM	ENDATIONS	
NASA	IOA	CRIT	SCREENS	1   1	CRIT	SCREENS	OTHER	ISSUE
FMEA NUMBER	ASSESSMENT NUMBER	•	A B C		HW/F	A B C	(SEE LEGEND CODE)	İ
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1	ARCS-1467	]		!!				
	ARCS-1468			!!				
	ARCS-1469	!		!!				
1	ARCS-1470	!		IJ		İ		 
ļ	ARCS-1471	!						
ļ	ARCS-1512			!!				 
	ARCS-1513		:	!!				] ) 1
!	ARCS-1514					]		! ! ! !
	ARCS-1515	<b> </b>   <b> </b>	<u> </u>			1		
	ARCS-1516		 	Н				
	ARCS-1517		] 	 		i I		1 !   {
	ARCS-1518   ARCS-1519		] ]	 				
1	ARCS-1519   ARCS-1520			1 1 1 1	!	1		i i
	ARCS-1521			; ; 		İ		i i
 	ARCS-1522	i ! I I		ij		1		i
1	ARCS-1523			ij		! 		
1	ARCS-1539	 	! 	11		i		i i
	ARCS-1540	<b> </b>   <b> </b>	: 	Н				i i
1	ARCS-1590	<b> </b>	i	П				i i
1	ARCS-1592			ii		ĺ		i i
<u> </u>	ARCS-1606		i	ii		ĺ		İİ
	ARCS-1608	ii	Ì	İi		İ		1 1
	ARCS-1612	ĺ		İ		ĺ		1
i	ARCS-1620	İ		П				
İ	ARCS-1628	i i	ĺ	H				
j	ARCS-1632	11	ļ	П		1		
İ	ARCS-1634			П		1		
	ARCS-1636	11				l		!!
	ARCS-1731	11	l	1		l		
1	ARCS-1732		l	П		1		
1	ARCS-1733			Ш		ļ		!!!
	ARCS-1734	!!	]		<u> </u>	į		ļ .
!	ARCS-1735		1	Ц	!	1		! !
!	ARCS-1736		!	П	1			]
	ARCS-1737	!!	!		!	ļ		1
	ARCS-1738		1	1	<b> </b> 	1		1 1
!	ARCS-1739		ļ		1	1	 	] [
	ARCS-1740				1	1		
1	ARCS-1741	]	j 1	H	 	1	] 	1 1 1 1
1	ARCS-1742   ARCS-1743	[ ] [ ]	I I	1	 	1	 	ı ! 
1	ARCS-1745	f   	1	1	] 	1	1 	ı   
1	ARCS-1744	1 I 1 I	1 1	1	! }	1	1 [	, l
1	ARCS-1745	1 I 1 I	1	1	ı İ	I I	1 1	
 	ARCS-1748	1.1 1.1	1	i			i İ	i
1	ARCS-1748	ii	1	i	i	ì	i	į i
	1	11	i	i	i	İ		į i
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IDENT	IFIERS		ASA	 		IOA	RECOM	MENDATIONS *		   
NASA FMEA NUMBER	IOA   IOA	CRIT	SCRI	: :	IT I/F	SCRI		OTHER	•	JE
	!	*****		   ===	====	====:			====== =====	===
	ARCS-1749		<u> </u>			!			ļ.	Į
!	ARCS-1750		ļ			!			ļ.	ļ
	ARCS-1751		!			1			!	
!	ARCS-1752		ļ			i			ļ	
ļ	ARCS-1753		ļ			!			ļ	
į	ARCS-1754	1	1	 		1			!	
1	ARCS-1755   ARCS-1756	ļ	 	 		1			!	
1	ARCS-1757	1	i I	 		1		1	l I	
1	ARCS-1757		l l			} 1		] 		
1	ARCS-1759	1	j I	H H		 		1	ļ i	
 	ARCS-1760	1	i i			! 		1		
1	ARCS-1761	1	 			l 1		1	l I	ļ
! 	ARCS-1762	1	 	1   1		l 		1	i i	
	ARCS-1763		! !			! !		1	i	
1	ARCS-1764	1	1			! 				
<u> </u>	ARCS-1765	i	; {	)		! 		! 	1	
1	ARCS-1766	Ì	1			! 		ì	İ	
	ARCS-1767	ì	<u>'</u>			! 		i	1	
1	ARCS-1768	ì	<u> </u>	i		i		1	i	1
İ	ARCS-1769	Ì	Ì	li		1		1	i	
1	ARCS-1770	i	İ	i		ĺ		1	i	,
	ARCS-1771	i	Ì	ii		İ		į	i	
Ì	ARCS-1772	i	Ì	i		İ		i	i	
İ	ARCS-1773	i	İ	i		İ		İ	i	
İ	ARCS-1774	i	Ì	ii		İ		İ	i	
	ARCS-1775	Ì	İ	ĺ		İ		i	ĺ	
	ARCS-1776	İ	İ	İ		İ		İ	ĺ	
	ARCS-1777	İ	ĺ	ĺ		ĺ		j	i	
	ARCS-1778	İ	1	ĺ		ĺ		İ	į	Ì
1	ARCS-1779		1					İ	i	Ì
1	ARCS-1780	1	1					Ì	ĺ	
1	ARCS-1781	1						1	İ	i
1	ARCS-1782	1	l	1		1		1	İ	į
	ARCS-1783	1	1			1		1		ĺ
	ARCS-1784	1				1		1	Ì	ļ
!	ARCS-1785							1	ĺ	į
	ARCS-1786			Н		1		1	ĺ	ĺ
1	ARCS-1787	1	l			l		1	1	İ
Ţ	ARCS-1788		1	Ц		l		1	1	1
!	ARCS-1789	1						1	1	Į
!	ARCS-1790	!	!	ļļ.		<u> </u>		1	1	
!	ARCS-1791	!		Ц				1	1	1
	ARCS-1792	1	!	1				1	1	1
<u> </u>	ARCS-1793	!	ļ	1				1	1	1
<u> </u>	ARCS-1794	!	!	1				ł	1	1
	ARCS-1795	1	ļ.	ļ.		<u> </u>		1	Ĭ	1
	ARCS-1796	1	l					]	1	1

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IDENTIF	IERS	NA	ISA		IOA RECOMM	IENDATIONS	ļ
NACA	AOI	CRIT	SCREENS	CRIT	SCREENS	OTHER	ISSUE
NASA FMEA NUMBER	ASSESSMENT NUMBER	HW/F	A B C	HW/F	A B C	(SEE LEGEND CODE)	1000 <u>1</u>
	*************	3232333		******	*****	=======================================	=====
1	ARCS-1797	i I	i	i			İ
<b>i</b>	ARCS-1798	i i		i	İ		
i	ARCS-1799	į į		İ	j		
i	ARCS-1800	İ					
i	ARCS-1801	į į		ĺ			
i	ARCS-1802	1 1					
i	ARCS-1803						
1	ARCS-1804			1			
	ARCS-1805	1		1			
1	ARCS-1806			1			
1	ARCS-1807	1					!
	ARCS-1808	1		1			!
1	ARCS-1809	1 1					[ [
1	ARCS-1810			ļ			[
1	ARCS-1811	! !					
1	ARCS-1812						
1	ARCS-1813						]
	ARCS-1814			1			
İ	ARCS-1815	!		<b>! !</b>			
1	ARCS-1816	!			!		
ļ.	ARCS-1817						ļ <u>1</u>
!	ARCS-1818				ļ		
!	ARCS-1819				 		i i 1 i
!	ARCS-1820		ļ	<b> </b>   <b> </b>	 		! ! !
1	ARCS-1821   ARCS-1822		 		! !		i i ! !
}	ARCS-1823	 	1 1	 	! !		, , 
1	ARCS-1824	1	! 	<b> </b>   <b> </b>	1		i :
1	ARCS-1825	1	! [			! 	i i
1	ARCS-1826	1	1		, 		i i
	ARCS-1827	i	1	1	i İ		i i
	ARCS-1828		<u>'</u>	i	İ		i i
i	ARCS-1829	i	i	ii	İ		i i
ì	ARCS-1830	i	Ì	ii	i		i i
i	ARCS-1831	ì	İ	ii	j		i i
	ARCS-1832	i	ĺ	İİ	Ì		1 1
i	ARCS-1833	İ	ĺ	11	1	1	
İ	ARCS-1834	İ	1		1		1
	ARCS-1835		1		1		1 1
	ARCS-1836		1		1		
	ARCS-1837	1	I		Į.	[	
1	ARCS-1838	1	!	[]	]		[ ]
1	ARCS-1839	I	<u> </u>	!!	!		ļ !
1	ARCS-1840	ļ	!		!	<u> </u>	. !
ļ	ARCS-1841	1	[	[ ]			
ļ	ARCS-1842	1	!		Į .		
	ARCS-1843	ļ	1		1	1	
l	ARCS-1844	1	I	11	I	1	 

IDENTIF	FIERS	N/	\SA		IOA RECOM	4ENDATIONS	 
NASA FMEA NUMBER	IOA     ASSESSMENT NUMBER	CRIT	SCREENS A B C	CRIT	SCREENS A B C	OTHER (SEE LEGEND CODE)	ISSUE
		======		======	=======================================	*************	======
1	ARCS-1845   ARCS-1846			11			]
;	ARCS-1847	†		11	 		] ]
1	ARCS-1848	 		11	 		
i	ARCS-1849				l I		! ! ! !
i	ARCS-1850			11	i İ	[	] 
i	ARCS-1851	i		ii			
i	ARCS-1852	i		ii			i i
i	ARCS-1853	i i		ii			
j i	ARCS-1854	j i		İİ	İ		i i
1	ARCS-1855			11	ĺ		İ
1	ARCS-2151			11			İ
1	ARCS-2152			$\Pi$			
1	ARCS-2153	1		11			
]	ARCS-2154						
!	ARCS-2155						
	ARCS-2156			!!			
!	ARCS-2157	!		!!			
!	ARCS-2158						]
!	ARCS-2159	!					!
	ARCS-2160						
1	ARCS-2161   ARCS-2162	1					
;	ARCS-2162     ARCS-2163	1					! ! ! i
i i	ARCS-2164	1		11			i !
1	ARCS-2165	1		11			
i i	ARCS-2166	i		ii			! ! ! !
İ	ARCS-2167	i		ii i		•	! !
į i	ARCS-2168	i i		ii i			i i
j	ARCS-2169	į į		ii i			i
į į	ARCS-2170	i i		ii i			i
1	ARCS-2171	1		ii i			į
1	ARCS-2172			11		1	
1	ARCS-2173			11 1			
! !	ARCS-2174	] [		11 1			
!!!	ARCS-2175						
!!!	ARCS-2176					'	
!!!	ARCS-2177	ļ <b>!</b>		!!		1	
	ARCS-2178	!!!					
	ARCS-2179	! !					
	ARCS-2180   ARCS-2181	i		11	 	!	
]	ARCS-2182	1   1			 	ļ	ļ
1	ARCS-2183	;   		11		!	
	ARCS-2184	: ! ! !			 		
	ARCS-2185	, ,   ,			 		
·	ARCS-2186	·		]]	 	! !	
, , 	ARCS-2187	, ' 			 	1	
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IDENTIF	IERS	1 1	NASA	IOA RECOMMENDATIONS						
NASA	IOA   ASSESSMENT NUMBER	CRIT	SCREENS	    CRIT    HW/F	SCREENS	OTHER (SEE LEGEND CODE)	ISSUE			
FMEA NUMBER	Y22522MEN: MOMBEY			======			=====			
*************	ARCS-2188	1	1	ii	İ	1				
	ARCS-2189	<b> </b>   <b>1</b>	i	ii	į	1	1			
	ARCS-2190	: <b>:</b>   <b> </b>	į	ii	İ		1			
	ARCS-2191		i	İİ	Ì	1	ļ			
	ARCS-2192	ii	i	Ï		1	ļ			
	ARCS-2193	ii	i	11	1	1	ļ			
	ARCS-2194	İ	Ì	11	1					
	ARCS-2195	ii	İ	11	1	1	ļ			
	ARCS-2196	ii	İ	11	1		1			
	ARCS-2197	ii	Ì	11	1		1			
	ARCS-2198	ii –	1	11	1					
	ARCS-2199	11	Ţ	11		!	1			
	ARCS-2200	11	1	11		İ	1			
	ARCS-2201			11			1			
	ARCS-2202	11	1		1		1			
	ARCS-2203	H	1	H	ļ		1			
	ARCS-2204	11	1	11	!	1	!			
	ARCS-2205	11		11	!		1			
	ARCS-2206	11	ļ	11	ļ		1			
	ARCS-2207	11	ļ	H	ļ		1			
	ARCS-2208	П	ļ		1		l I			
	ARCS-2209	11	. !	11	1		i			
	ARCS-2210	Ш	ļ	11	ļ	! 	i			
	ARCS-2211	11	ļ	11	l I	1	i			
	ARCS-2212	11	!	11	i I	1	į			
	ARCS-2213	11	1	11	-	 	i			
	ARCS-2214	11		11	1	]	i			
	ARCS-2215	11	i i	11			Ì			
	ARCS-2216	11	ļ	11	l L	! 	i			
	ARCS-2217	11	l I	11	1	;	i			
	ARCS-2218	11	l 1	11	1		İ			
	ARCS-2219	11	1	11	i	i	Ì			
	ARCS-2220	11	1		i		1			
	ARCS-2221   ARCS-2222	11	1	ii	i		1			
	ARCS-2222   ARCS-2223	11	i	11	Ì	İ	1			
	ARCS-2224	11	i	ii	i	i	1			
	ARCS-2224		i	ii	i	Ì	1			
	ARCS-2226	H	i	ii	į		1			
	ARCS-2227	ii	i	ii	į					
	ARCS-2227	ii	i	ii	İ					
	ARCS-2229	ii	i	ii	İ		1			
	ARCS-2230	ii	i	ii		1	ļ			
	ARCS-2231	ii	į	İİ	1	1	ļ			
	ARCS-2232	ii	i	11	1	1	ļ			
	ARCS-2233	ii	į	11		1	ļ			
	ARCS-2234	ii	Ì	11		ļ	ļ			
:======================================	APCS-2235	ii	i	11	1	1	1			

IDENTI	FIERS	N	IASA			IOA RECOM	MENDATIONS	
NASA FMEA NUMBER	IOA     ASSESSMENT NUMBER		SCREENS	-         	CRIT HW/F	SCREENS	OTHER (SEE LEGEND CODE)	ISSUE
	***************		2=======	=	======	=======	=======================================	=====:
	ARCS-2236	1	!	Ш		1		İ
	ARCS-2237	!	!	П		!		1
	ARCS-2239	1		!!		İ	1	1
	ARCS-2240	1	1	!!				İ
	ARCS-2241	! !	1					
i	ARCS-2242	1	! 1			 		1
i	ARCS-2243	! 	1 1	!!				!
i	ARCS-2244	! [	r I	11				!
	ARCS-2245	i	! !	11				ļ
į	ARCS-2246	i	1 					!
	ARCS-2247	, 	! 					!
į	ARCS-2248	; 	! ]	11				<u> </u>
	ARCS-2249							
į	ARCS-2250			Н	1	!		
i	ARCS-2251					1		
Ì	ARCS-2252			11	 	1		
İ	ARCS-2253			Н	ľ	ļ		
İ	ARCS-2254			li	i	ł	İ	
1	ARCS-2255			Н	i	i		
1	ARCS-2256	ļ		ii	i	!		
1	ARCS-2257	i		ii	i	ł		
1	ARCS-2258	i		ii	i	ł		
1	ARCS-2259	j		ii	i	i	 	
1	ARCS-2260	ĺ		ii	i	i	 	
1	ARCS-2261	ĺ		ii	i	i	; !	
1	ARCS-2262	1		İİ	i	i	 	
1	ARCS-2315	1		ij	i	i		
1	ARCS-2342			Ϊİ	i	i		
:	ARCS-2343	1		П	i	i	1	
:	ARCS-2344	1			į	i	}	1
	ARCS-2345	- 1		1	i	i	1	
	ARCS-2346	1			i	į	i İ	
•	ARCS-2347	1		1	i	i		
•	ARCS-2348	1		1	1	j	i	
·	ARCS-2349	ľ		1	i	į	i	i i
· · · · · · · · · · · · · · · · · · ·	ARCS-2350	1			- 1	i	i	!
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•	ARCS-2352	J		1		ĺ	i	1
	ARCS-2353	1			- 1	į	i	i
•	ARCS-2354	ļ	ı	1	1	İ	ĺ	,
	ARCS-2355	!			I	ĺ	i	i
	ARCS-2356	ļ		1	1	İ	i	i
•	ARCS-2357	!	1		1	ļ	j	i
•	ARCS-2358	ļ	1	Į.	1	1		i
	ARCS-2359	ļ	1		- 1	1	i	i
•	ARCS-2360	!	1	ļ	1	1	i	i
/   :====================================	ARCS-2361	1	1		1	1	i	i

IDENT	IFIERS	11	N	IAS	SA		 -1	 		IOA RECOMP	ENDATI	ONS	   
NASA FMEA NUMBER	IOA   ASSESSMENT NUMBER		CRIT HW/F			CREE B	    =:	   CRIT   HW/F  ======	į	SCREENS   A B C	(SEI	OTHE LEGENC	ISSUE      -=====
	ARCS-2362   ARCS-2363   ARCS-2364   ARCS-2365   ARCS-2366   ARCS-2367   ARCS-2368   ARCS-2369							 					
	ARCS-2370   ARCS-2371	11							1				     

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MCDONNELL DOUGLAS ASTRONAUTICS COMPANY - HOUSTON 16055 SPACE CENTER BLVD, HOUSTON, TEXAS 77062